HNOLOGY DEPT

JUNE 1953

The Paper Industry

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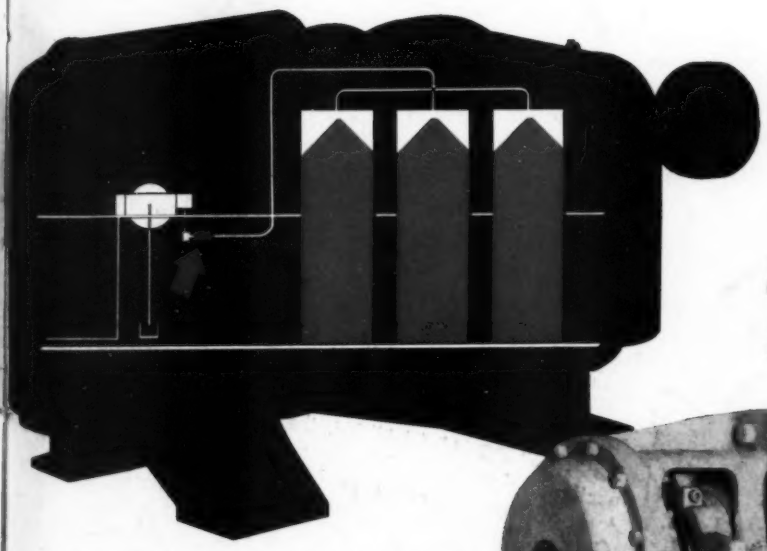
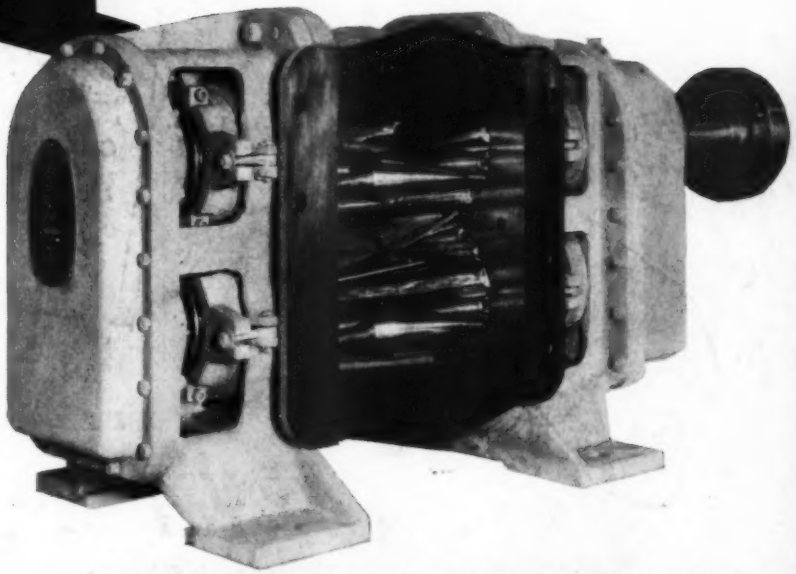
DETROIT

IMPCO THICK STOCK PUMP



PUMPING
10%-17% PULP
SERIES - 300*
SERIES - 500*



s unit is a positive displacement type pump cifically designed to handle pulps at high den- es. The conical profile of its synchronous rotors mits the pumping of stock at densities above % A.D.—with lowest horsepower per ton—and fibre damage. Operating on all types of stock as:

- A transport pump on high density stock
- A feeder to high density hypochlorite and ClO_2 bleachers.
- A beater filling pump from storage.

y the modern way to handle pulp.

*—*Tons per day.*

IMPCO

IMPROVED MACHINERY INC.
NASHUA—NEW HAMPSHIRE
Sherbrooke Machineries Limited manufacture similar equipment in Canada.

ROTARY UNION

THE ROTARY STEAM CONNECTION

...Saves you Trouble and Money

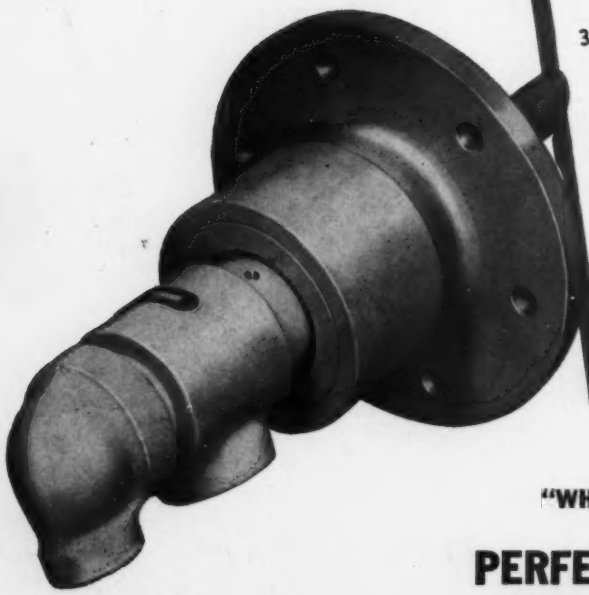
Paper mill maintenance men like the Type "FSG" ROTARY UNION because it saves them lots of trouble. Many report over three years of perfect heavy duty service on dryers, calenders, digesters, etc. *without requiring one minute's maintenance of any sort.*

Paper mill production men like the Type "FSG" because it practically eliminates down time due to sealing failures.

Some of its special features which contribute to this exceptional service are:

1. Flanging directly to the journal and revolving with the drum itself. This takes strain off sealing parts.
2. Heavy duty metal-backed graphite bearing which requires no lubrication and permits continuous high speeds under high pressures and temperatures.
3. Two point syphon support which prevents wearing through and falling off of syphon pipes.

Save yourself trouble and expense by standardizing on the "FSG" ROTARY UNION, the revolving steam connection designed especially for paper mill service. Contact our nearest office or write Dept. 6P for our Catalog.



Type "FSG" ROTARY UNION

"WHERE *Good Connections* COUNT"

REG. U. S. PAT. OFF.

PERFECTING SERVICE COMPANY

332 Atando Ave. (Home Office and Factory) Charlotte, N. C.

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Asten DRYER FELTS

It's better inside

Nothing is as convincing as first-hand experience,
especially when it comes to the performance of ASTENS.

Economy in the long run

ASTEN-HILL MFG. CO.
PHILADELPHIA, PENNA.

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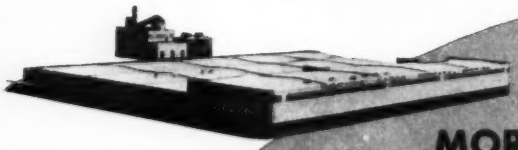
VALLEYFIELD, QUEBEC



(for *Nalco*—and MORAINE PAPER COMPANY)

THE ultramodern building of the Moraine Paper Company Division of the American Envelope Company at West Carrollton, Ohio, houses equally modern, efficient equipment for fine paper-making. In addition to Nalco 71 antifoam, pictured above being applied at the Bird screens with a Nalco Feedrator, Moraine also uses Nalco 918 in the bleach plant and at the repulper to prevent scale formation throughout the stock system. Nalco 680, applied at the headbox, has been helpful in securing more uniform sizing, higher, more uniform ash content at lower chemical cost, a higher operating pH and better pH control, improved fibre retention, and elimination of wire deposits.

For the same results in your mill with these, and other Nalco System chemicals and services, call your Nalco Representative or write direct for prompt action and complete information.

WRITE FOR THIS BULLETIN

Free upon your request

Nalco Bulletin 55 gives data on all Nalco System products and services for the paper industry. Your copy will be sent, without obligation, upon your request. Ask for Bulletin 55 today.

NATIONAL ALUMINATE CORPORATION
Chicago 38, Illinois
6232 West 66th Place
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THE *Nalco*® SYSTEM • Serving the Paper Industry through Practical Applied Science

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 35 • NUMBER 3 • JUNE, 1953

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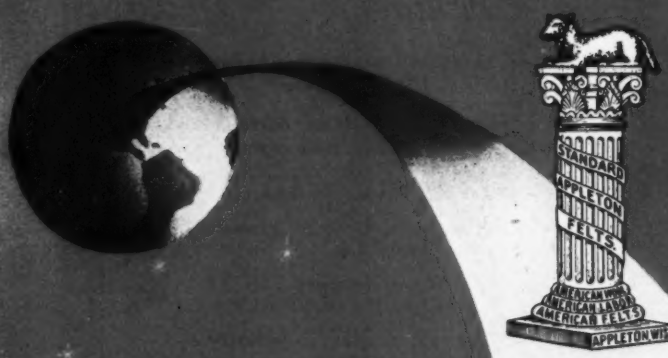
known the country over for . . .



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DEPENDABILITY
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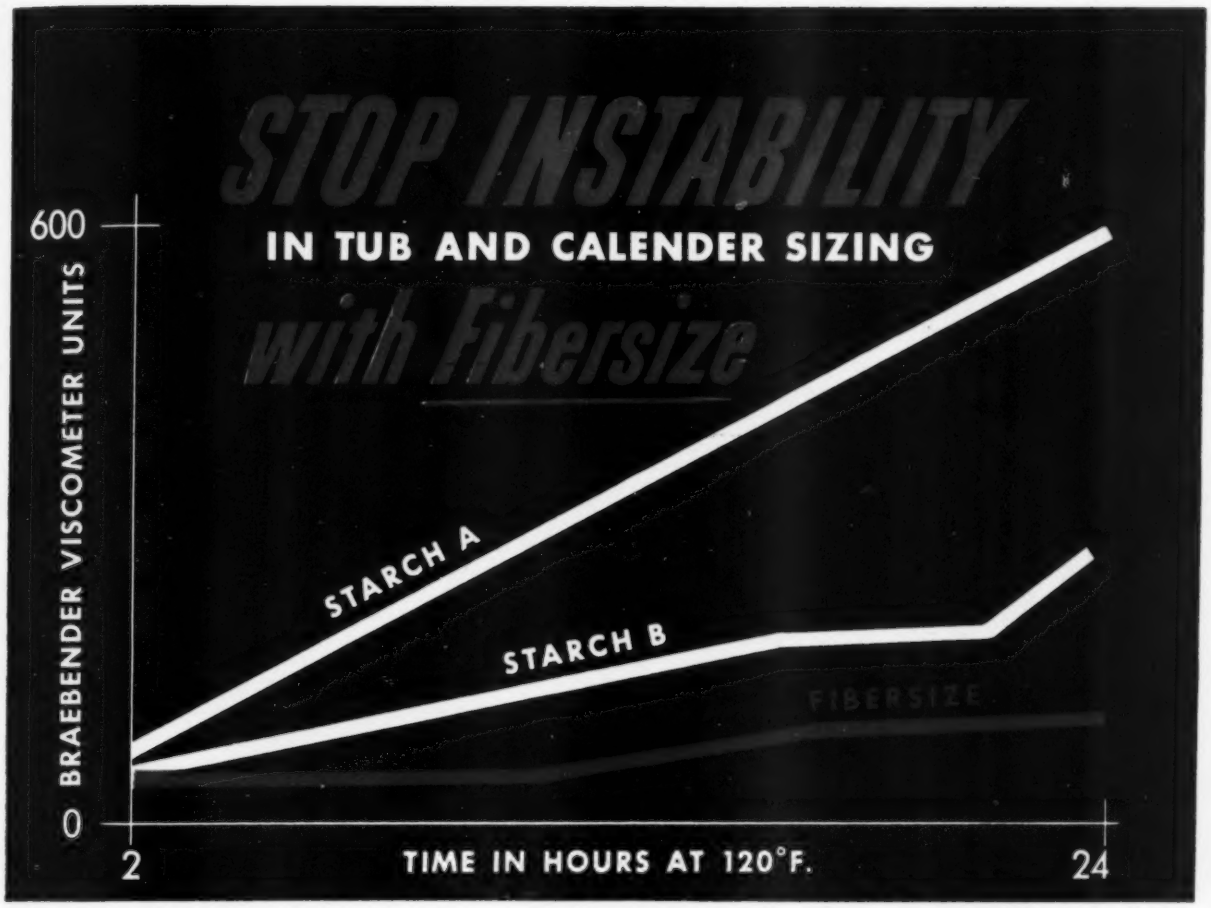
DESIGN

Appleton Felts

APPLETON WOOLEN MILLS

APPLETON,
WISCONSIN



The graph tells the story of FIBERSIZE's performance—
its amazing stability as compared with competitive starches.

Now, about the product . . . it's an oxidized starch that gives you *controlled penetration* in tub and calender sizing. It holds its viscosity over long periods of time. It won't become viscous and stick to rolls, causing paper to tear.

FIBERSIZE also has better strength characteristics than enzyme-converted starches. It has good clarity, permitting increased brightness and gloss of the sheet. And it is excellent for use in glassine and and other grease-proofing operations.

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STARCH PRODUCTS

National Starch Products Inc., 270 Madison Ave., New York 16, N. Y.

I'D LIKE TO STOP INSTABILITY in tub and calender sizing.

Please send—

☐ Technical data on FIBERSIZE
☐ A sample of FIBERSIZE

Name_____ Title_____

Company_____

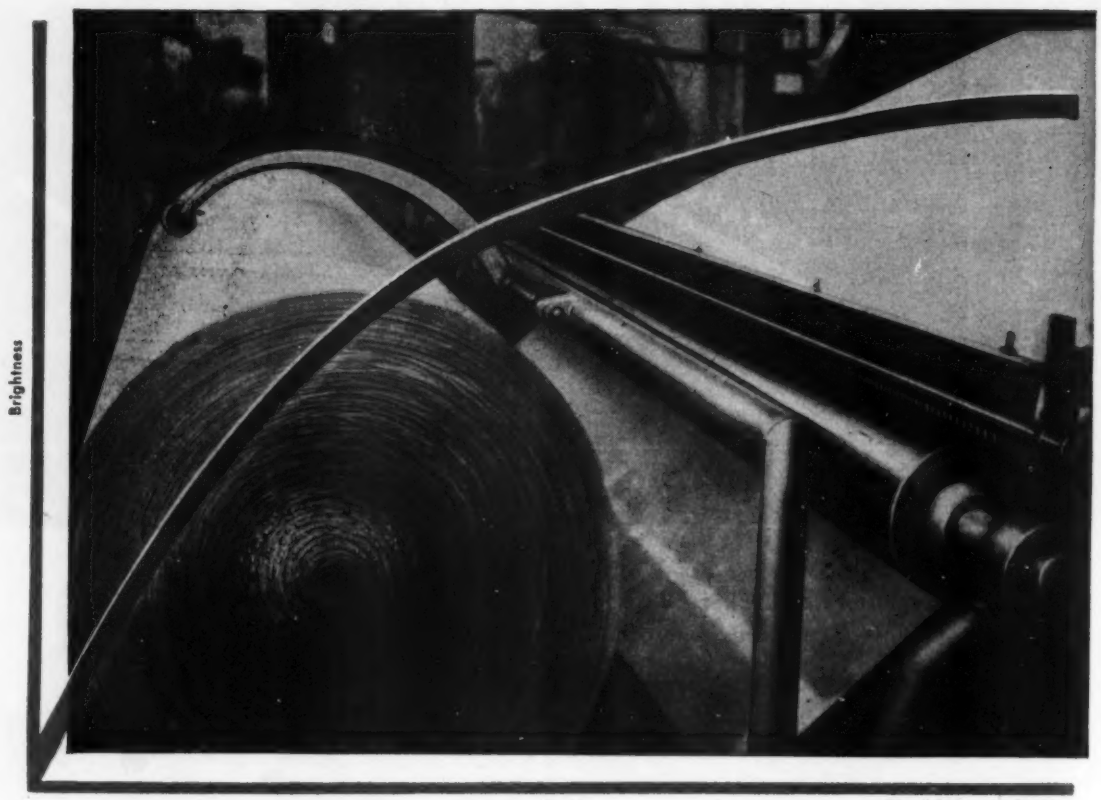
Address_____

City_____ Zone____ State_____

High Density Bleaching of Chemical and Mechanical Pulps with Hydrogen Peroxide

BECCO

HYDROGEN PEROXIDE AND OTHER PEROXYGEN CHEMICALS



Bleach Liquor Application on the Kamyr machine

Chemical and mechanical pulp webs and cut chemical pulp sheets can now be bleached at much higher chemical concentrations and at higher chemical efficiency than heretofore. Color stability for reasonable periods of time is excellent.

The new Becco high-density method is suitable for use on any self-sustaining web-producing machine or cut sheets can be bleached by the mill previous to use. Equipment requires a minimum of valuable mill space.

Methods and equipment for semi-automatic or fully automatic high-density pulp sheet bleaching are in an advanced stage.

For full information write Becco or talk with any Becco representative.

Buffalo Electro-Chemical Company, Inc.

fmc

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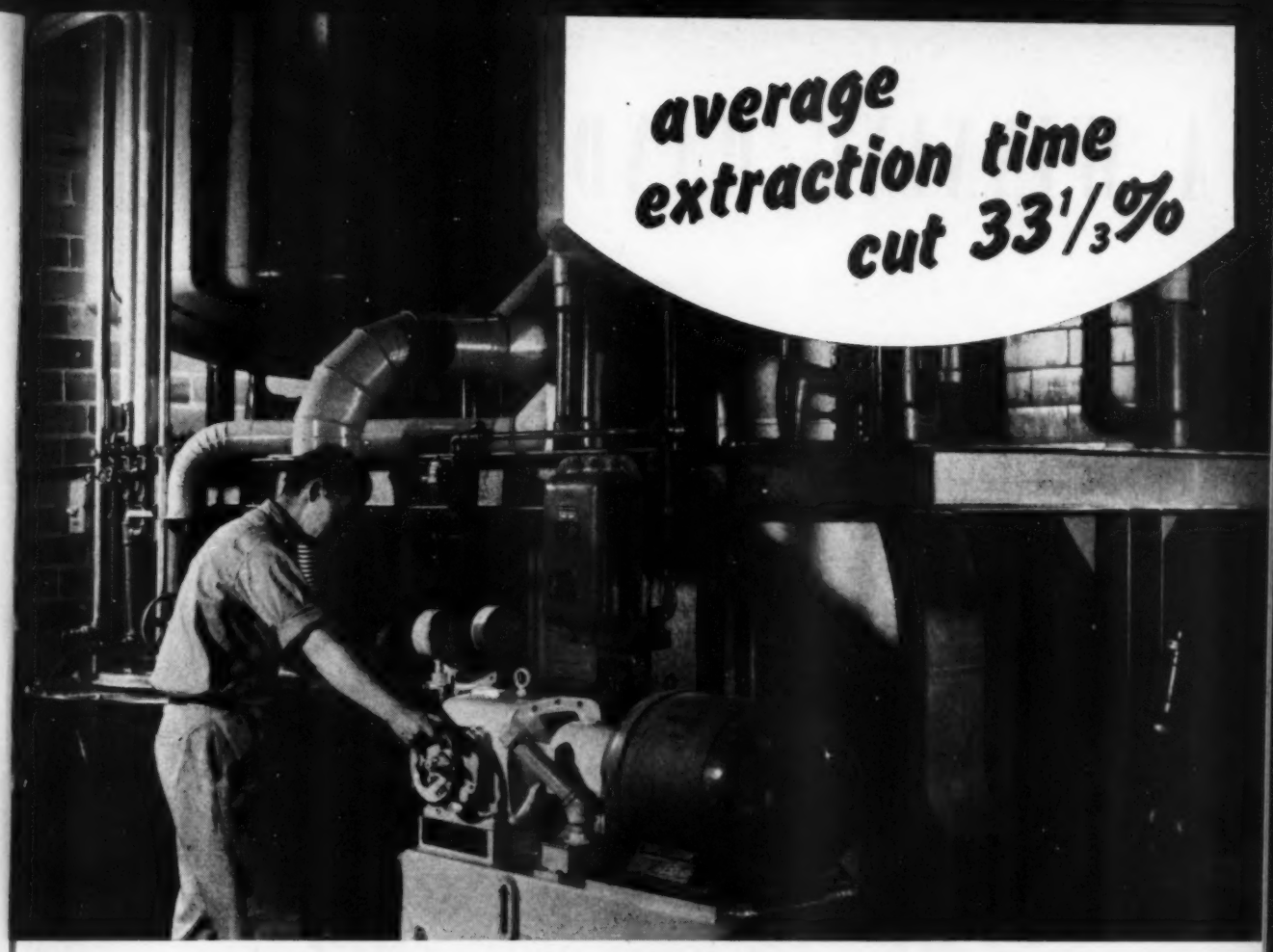
Sales Agent: BECCO SALES CORPORATION, Station B, Buffalo 7, N.Y. • Buffalo • Boston • Charlotte • Chicago • New York • Philadelphia • Vancouver, Wash.



Once more the ANY-SPEED Oilgear Drive betters machine performance "painlessly"

Many times in our experience the performance of an already highly efficient machine has been bettered without redesign, solely by changing the drive. One case out of many *varied* cases, is the Tolhurst Centrifugal pictured above, located in a great pharmaceutical house. This centrifugal was originally equipped with a two-speed electric motor drive. However the chemicals it is called upon to handle have widely varying crystal packing characteristics. Some of these crystals packed so densely at the speed available, extraction was inhibited, extraction time far out of balance and crystal removal difficult.

A change was made to an *"ANY-SPEED"* Oilgear Fluid Power Drive. Now the operator is able to shade the speed of the centrifuge experimentally—*and easily discover* the *best* speed for each batch of crystals.

As a result, extracting that used to take from 6 to 9 hours was cut to 4 to 6 hours. The extremely slow speed also available made unloading a great deal easier. This user now has several other Oilgear drives including one on a laboratory centrifuge.

There is very often a direct efficiency coefficient between machine operating speed and the type of work being handled. And we can cite many widely varying instances where equally dramatic and profitable gains resulted at once from a simple change to *"ANY-SPEED"* Oilgear Fluid Power Drives. If you want some interesting factual data on Oilgear's steplessly variable speed drives, their outstanding responsiveness to control impulses, their smooth acceleration and deceleration, talk to an Oilgear Engineering Representative. His mature and sound engineering recommendations may profit you greatly. THE OILGEAR COMPANY, 1578 W. Pierce St., Milwaukee 4, Wisconsin.

OILGEAR

OILGEAR

A WINNING HAND...

. . . in Dryer Felts!

Each *HOOPERWOOD* dryer felt is scientifically designed to meet specific drying conditions. Cotton or Asbestos . . . there is a *HOOPERWOOD* felt to help YOU win the battle of rising costs.

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Hooperwood Mills: Woodberry, Baltimore 11

"We get out wood we used to pass up"

International T-6 Crawler Opens Up Pulpwood Tracts for Georgia Logger

Around Waverly, Georgia, there's a lot of timber the pulpwood loggers have been passing up for years because it was always considered too difficult to harvest at a profit.

But 30 months ago Sylvester Baker purchased an International T-6 logging tractor.

"Now I get out wood I never tried to work before," he says. *"I like this little tractor and my neighbors like theirs because they work hard, get out more units and hold up better than anything else in the woods."*

See the entire line of fast-working, low-cost International logging tractors for yourself. Let your International Industrial Distributor put International "Power that Pays" on your jobs and you'll profit both in increased production and by lower costs.

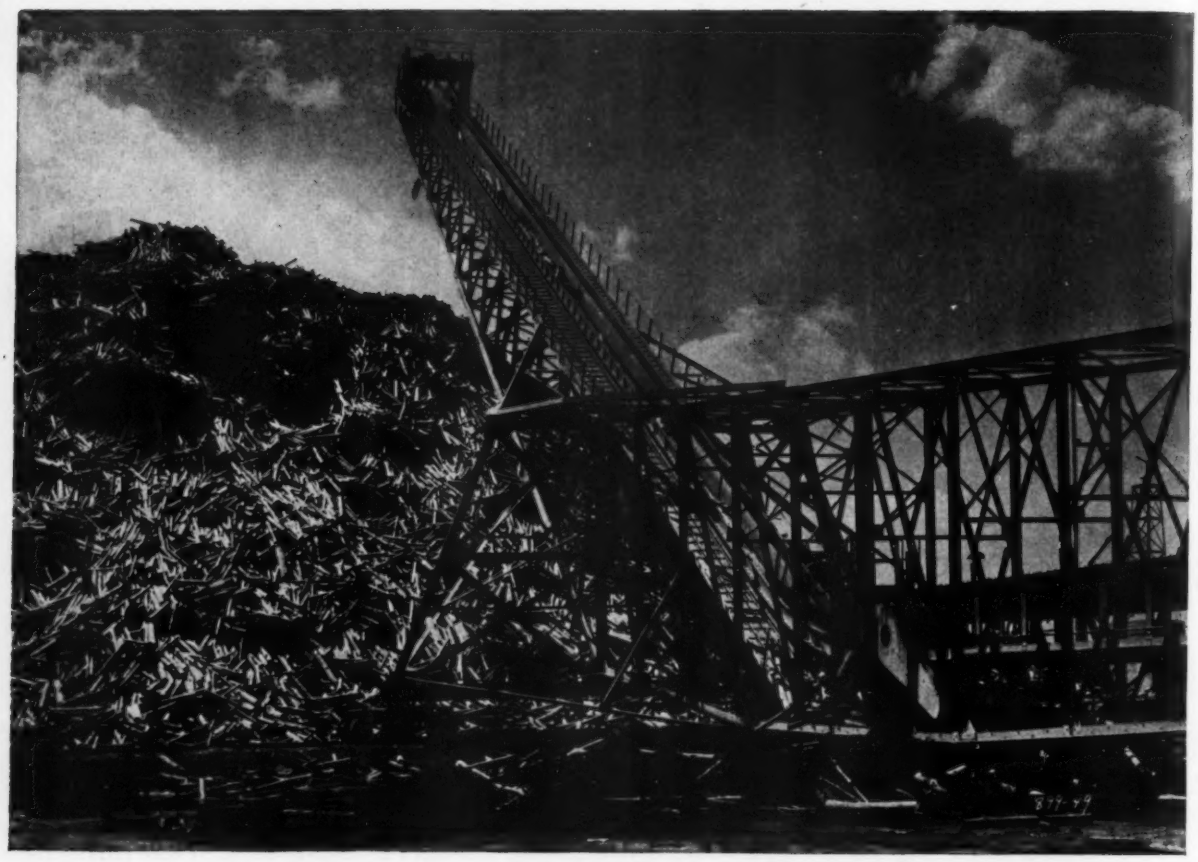
INTERNATIONAL HARVESTER COMPANY
CHICAGO 1, ILLINOIS

INTERNATIONAL

INTERNATIONAL HARVESTER

POWER THAT PAYS

SMALL BUT MIGHTY. This International T-6 is small in size only. It helps Sylvester Baker average 11 units of pulpwood daily near Waverly, Georgia.

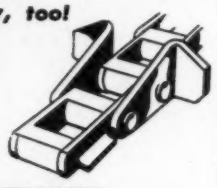


The timber that took a taxi

Macon-Kraft, down deep in Georgia, cut a forest of pulpwood logs. They wanted to stack them fast, to feed their chippers all winter long. Jeffrey engineers installed a traveling pulp stacker with special chain conveyor "flights" to cradle each log. Soon more than *3 million* had taxied high. This travel-log typifies results of "The Team That Gets Things Done"

...that's JEFFREY!

***This** is Jeffrey, too!*



S-212 — SPUR ATTACHMENT

This rugged spur attachment for Jeffrey Special PW pulpwood chains is made of high carbon steel, formed hot in a hydraulic press. It is braced sidewise to slide smoothly and stand the pounding of heavy logs. It's one of the many parts Jeffrey manufactures each year — each built to rigid standards — to serve industry everywhere.

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED
...IT'S A JOB FOR JEFFREY!

ANOTHER E.D. Jones INSTALLATION

A new worm adjusting mechanism is featured in these 4 Jones Majestic Jordans at Weyerhauser's new board mill at Longview, Wash.

ANOTHER E.D. Jones INSTALLATION

These 5 Jones Majestic Jordans were part of the $15,000,000 expansion program at Hollingsworth & Whitney's Mobile, Ala., plant.

Majestic is the word for these Jordans

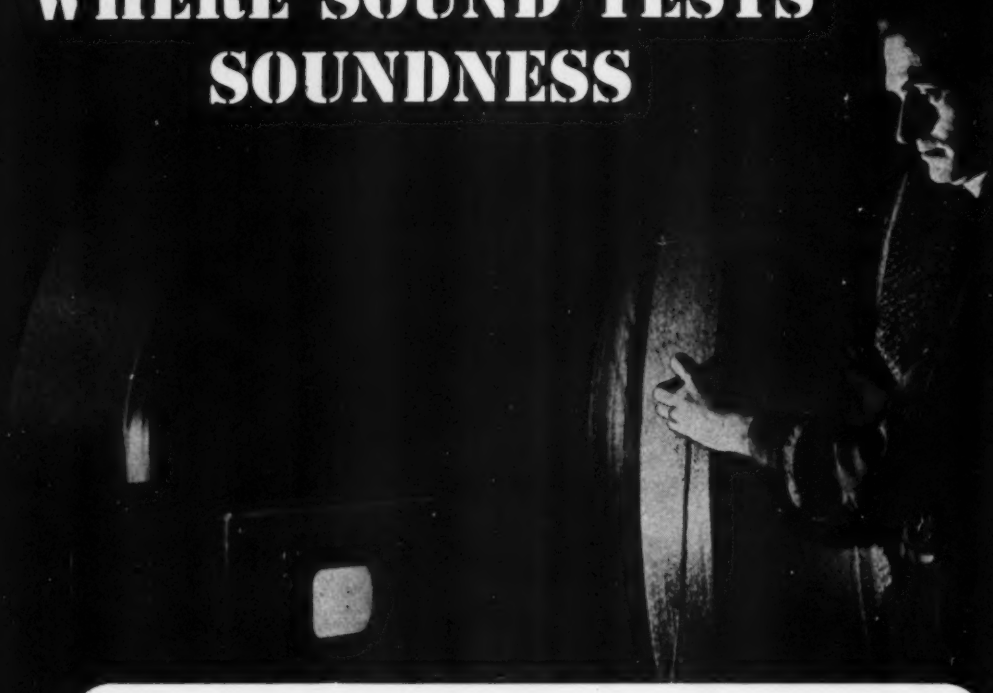
The Majestic is only one of the many sizes in which Jones Jordans are made. But such is the popularity of this high-capacity work horse that it accounts for 25% of the Jones Jordans sold to date. Like all Jones Jordans it incorporates exclusive features developed from our more-than-a-century of service to paper mills. For more details, ask your Jones representative or write for Bulletin 1007-A.

E.D. Jones

E. D. Jones & Sons Company, Pittsfield, Mass.

BUILDERS OF QUALITY STOCK PREPARATION MACHINERY

WHERE SOUND TESTS SOUNDNESS



MIDVALE ULTRASONIC TESTS ASSURE QUALITY BEYOND THE CALL OF SPECIFICATIONS

Pressure Vessels
Forgings and Rings
Hardened & Ground Steel Rolls
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Sound Waves "bouncing" up to ten million cycles per second seek out and find the smallest defect . . . assure quality forgings at Midvale . . . Ultrasonic waves able to penetrate thirty feet of the toughest steel.

In addition two million volt X-Ray unit . . . magnetic particle inspection . . . "black light" . . . dye penetrants are but a few of the many ways Midvale craftsmen safeguard unsurpassed quality.

Midvale precision and performance can supply all your needs for heavy equipment in industry. Pressure vessels . . . hardened and ground steel rolls . . . weldless rings . . . forgings . . . heat and corrosion resistant castings. If the job is big, specifications exacting, peak quality a "must", you can rely on Midvale craftsmen.

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MIDVALE

Custom Steel Makers to Industry

PRODUCERS OF FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

PROOF!

KELSIZE keeps glue line where you need it!

Maximum bond and 100% fibre pull does not depend on excessive penetration as proven by illustration below showing complete fibre pull of pressure sensitive tape whose penetration factor is nil.

1. Stick strip of tape to piece of corrugated paperboard.

2. Lift tape off. Note how surface fibres of paperboard adhere to tape, proving a completely uniform bond has been obtained.

Make this test yourself. Prove that you don't need excessive glue penetration for maximum bond. In fact, only by keeping the glue line at surface do you get maximum bond — with substantial glue savings!

A fraction of a percent of KELSIZE added to your adhesive will control penetration and keep your glue line where you need it.

KELSIZE insures uniform adhesive application and aids in moisture control of corrugated paperboard

KELSIZE® a product of **KELCO** company

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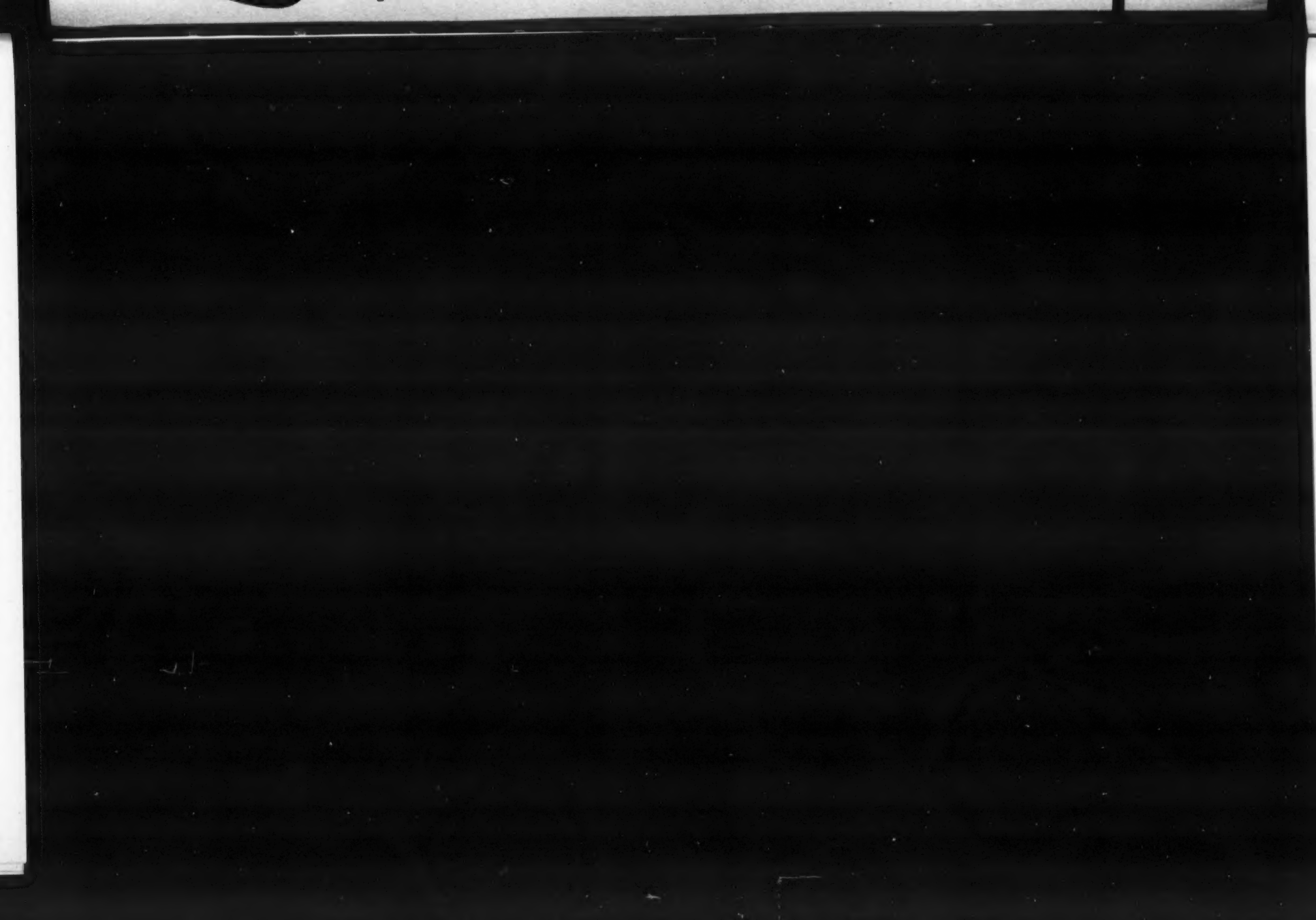
KELCO
REFINED ALGIN PRODUCTS

THE MIDDLE ATLANTIC AREA—another in a series of scenes . . . regions where Appleton Wires serve the paper industry.

BACKTRACK from the Ohio river valley through the Middle Atlantic Area...cross rugged, mountainous Pennsylvania to New York and the Atlantic Coast, and you have traversed an area of typical, diversified America.

Here, blended in with an economically healthy panorama of agriculture, romantic river traffic and busy industrial centers is the paper industry. Yes, here are hundreds of mills...and, you can bet that practically every one using Fourdrinier wires already knows that *Appleton Wires are Good Wires!*

APPLETON WIRE WORKS, INC., APPLETON, WISCONSIN



Check List

for selecting a Piping Contractor

Listed below are a number of important factors that should be taken into account whenever you select a piping contractor. If any of these are overlooked, you are not buying your piping construction to best advantage.

☐ **EXTENSIVE SIMILAR EXPERIENCE** • Is the contractor thoroughly experienced on your type of work? Problems are always more readily solved when they have been met before.

☐ **MODERN FABRICATING PLANTS** • Fully equipped plants staffed by piping experts mean practical piping subassemblies that are correctly planned and prefabricated to simplify and expedite field erection.

☐ **PROGRESSIVE ORGANIZATION** • You want a contractor who keeps abreast of new piping developments. Piping research on a continuous basis should be his policy.

☐ **CONVENIENT LOCATION** • A fabricating plant near enough to give you quick service is of prime importance. Convenient location also improves overall supervision of the job.

☐ **SUPERIOR FIELD FACILITIES** • A job of any size needs a resident superintendent with a permanent staff of supervising erectors. Welders should be qualified on your materials.

☐ **PLUS SERVICES** • The experienced contractor often can make suggestions that result in improved piping design and savings in time and money.

4586

You can check all these when you select MIDWEST

MIDWEST PIPING SERVICE IS NATION-WIDE

4 Plants Are Better Than 1

PIPING FABRICATORS AND CONTRACTORS

MIDWEST PIPING COMPANY, INC.

Main Office: 1450 South Second Street, St. Louis 4, Mo.

Plants: St. Louis, Passaic, Los Angeles and Boston

Sales Offices: New York 7—50 Church St. • Chicago 3—79 West Monroe St.
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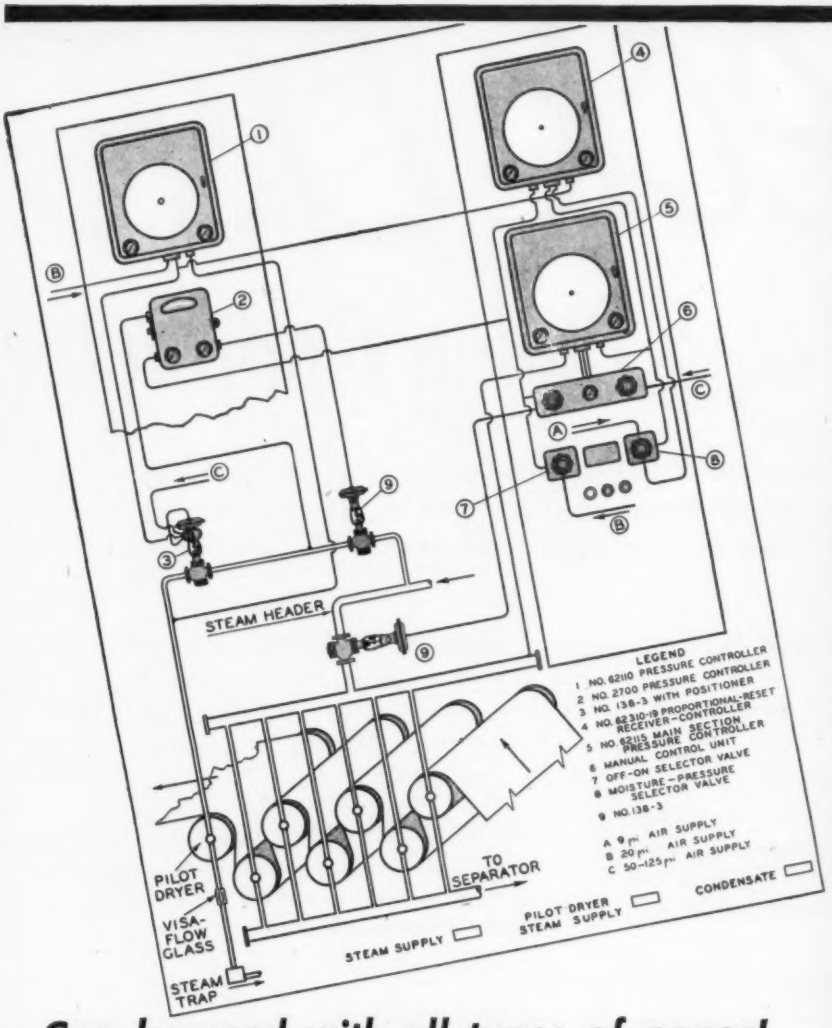
Versatile NEW MOISTURE CONTROL SYSTEM



Can be used with all types of paper!

Any speed of machine!

Extremely sensitive yet stable, this new Masoneilan Moisture Control System offers many unique advantages for improved paper-making:

Maintains average moisture content across the sheet. Does not rely on 'spot' measurements.

Controls moisture percentage at one or several points along machine.

Can be used for any machine speed — any machine width.

Is suitable for any grade or weight of paper.

Is flexible — system may be applied to one or more sections.

Provides pneumatic individual break control for each control location.

Continuously records operating steam pressures, moisture deviation, time and duration of breaks.

Complete information will be furnished on request.

CONTROLS MOISTURE CONTENT AT . . .

- Breaker Roll
- Single or Multiple Dryer Sections
- Size Tub
- Coating Press
- Reel

MASON-NEILAN REGULATOR CO.

1187 ADAMS STREET, BOSTON 24, MASS., U. S. A.

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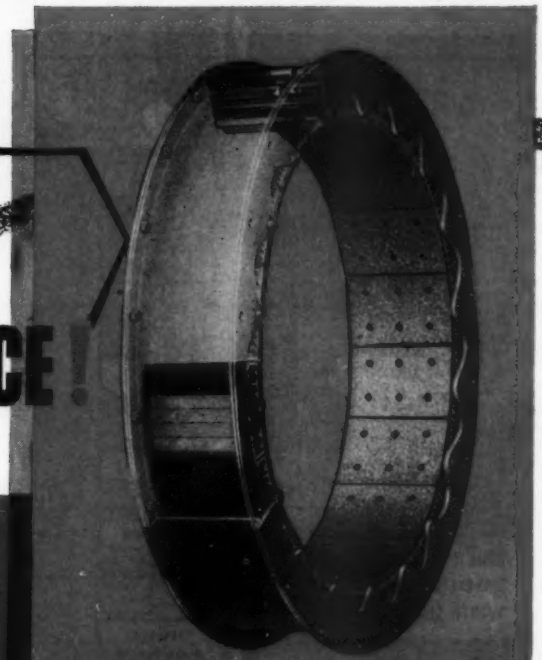
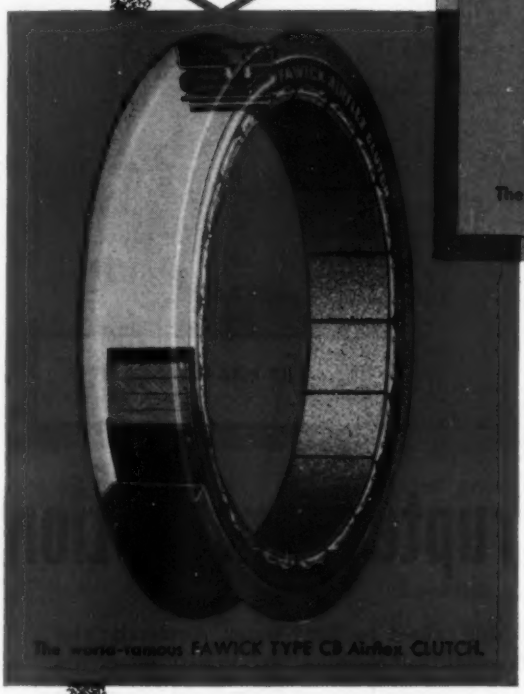
MASONEILAN

FAWICK GIVES YOU YOUR CHOICE!



The NEW completely ventilated FAWICK TYPE VC Air-Ring CLUTCH.



The world-famous FAWICK TYPE CB Airflex CLUTCH.

● *Every industrial clutch application requires specific operating characteristics for highest efficiency and safety.*

Continuing the FAWICK policy of supplying industry with the best in clutches and brakes, FAWICK AIRFLEX now provides, in addition to the world-famous FAWICK TYPE CB, the new completely ventilated FAWICK TYPE VC Air-Ring CLUTCH.

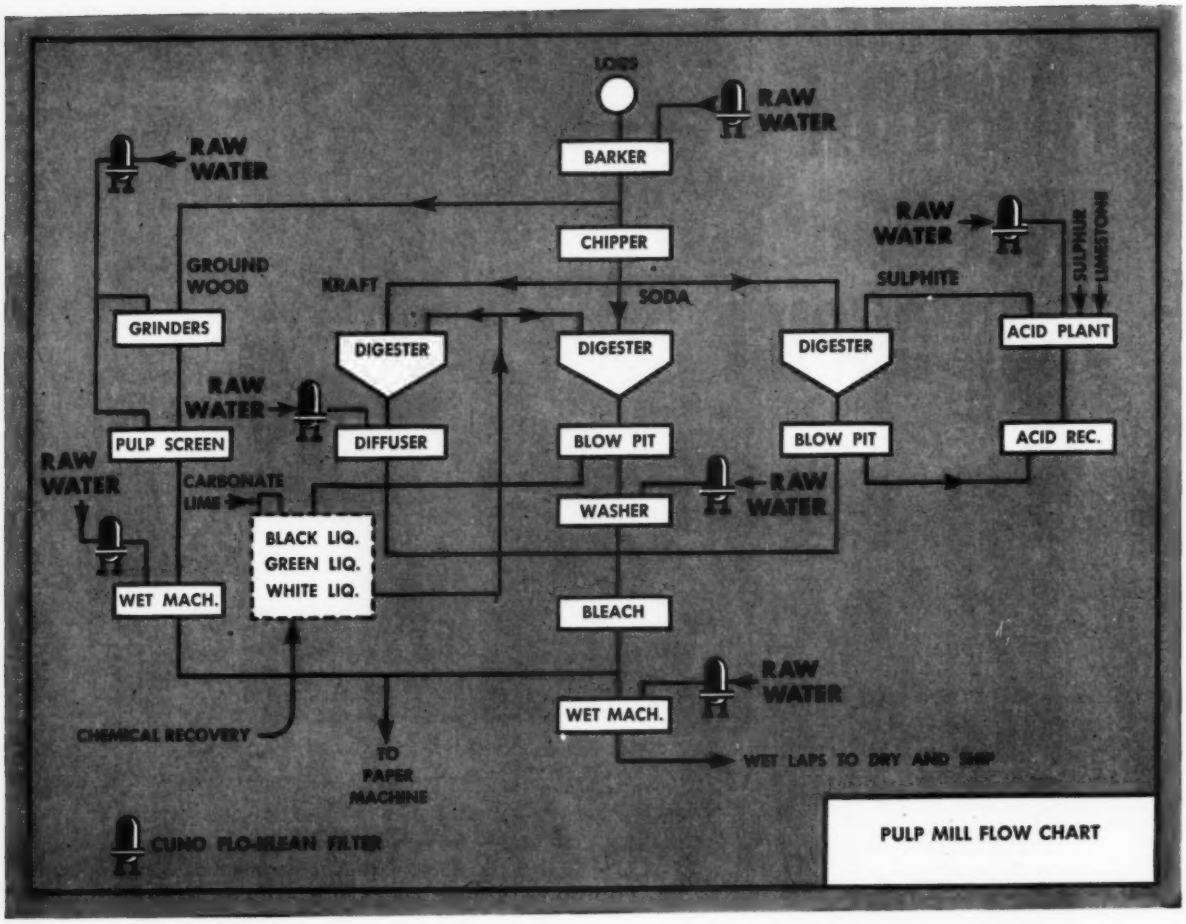
Clutch design features found only in this new VC CLUTCH include (1) cooler operation inherent in drum clutch design; (2) isolation of the operating tube from the heat-generating friction surface; (3) riveted, replaceable friction lining; (4) loose, expanding operating tube which can be replaced without removing the clutch from the shaft.

This FAWICK rigid-type VC CLUTCH is unmatched for heavy-duty service where high starting loads or sustained slippage generate high operating heat that lowers operating efficiency and shortens clutch life. The cooler operation and other advantages found in the FAWICK TYPE VC provide "new clutch" performance throughout a long, maintenance-free life.

For Further Information write for Bulletins 400-A and ML-102.

FAWICK AIRFLEX DIVISION
FEDERAL FAWICK CORPORATION
9919 CLINTON ROAD • CLEVELAND 11, OHIO

FAWICK Airflex
INDUSTRIAL CLUTCHES AND BRAKES



Plan for longer uninterrupted production

When paper and pulp mills have clogged showers or damaged wet felts and Fourdrinier wires, it takes time and money to get going again.

Paper and pulp men have learned from experience that they can avoid costly down-time by installing Cuno FLO-KLEAN filters in their water systems. FLO-KLEAN filters remove harmful solids from river, lake or well water before equipment can be damaged.

You can install a FLO-KLEAN and forget about down-time caused by dirty water. Automatic and continuously self-cleaning, FLO-KLEAN filters are available to handle between 200 and 100,000 gallons of water per minute—with no interruption of flow, and no loss of backwash water. Pressure loss is negligible in this corrosion- and abrasion-resistant unit.

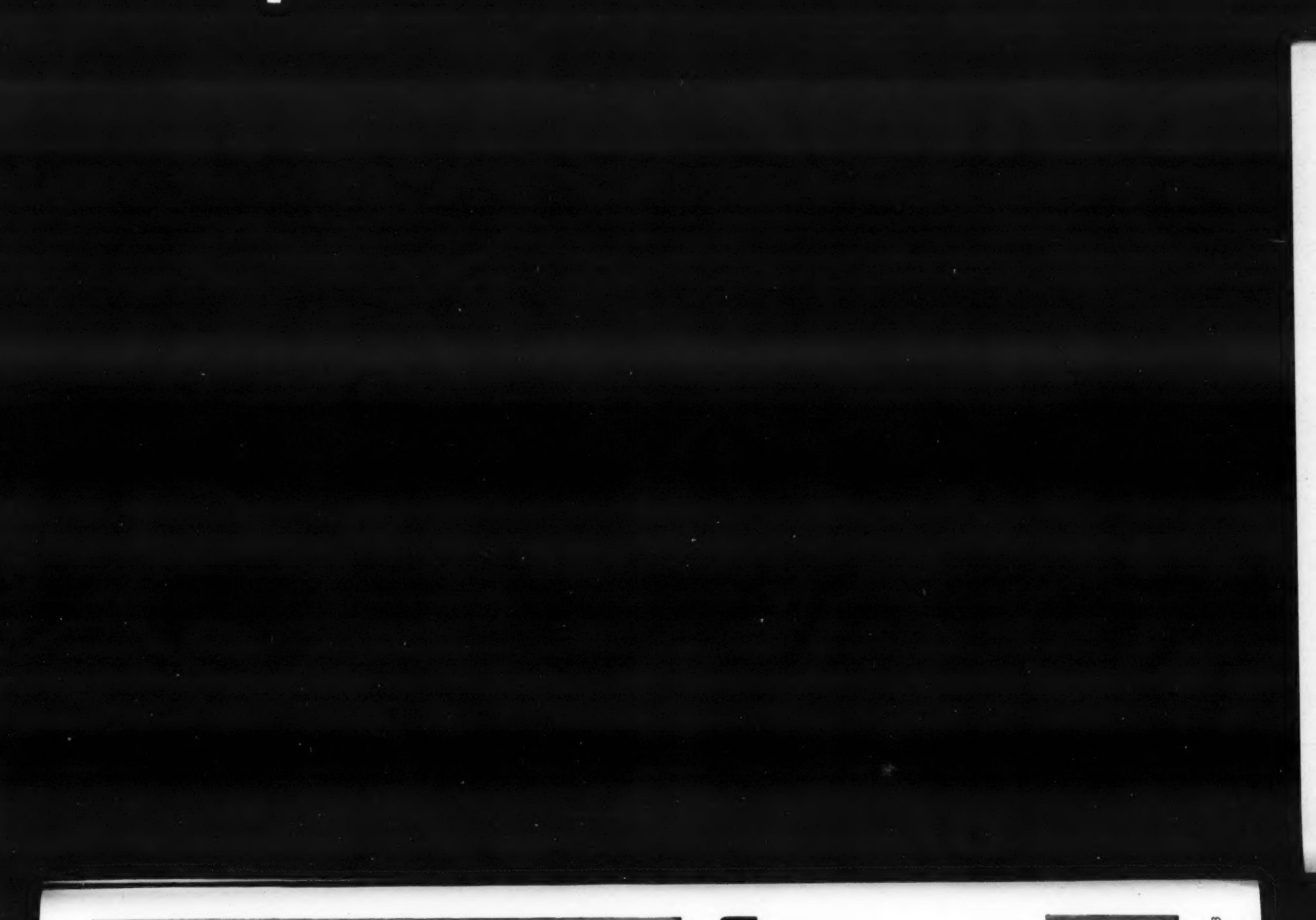
To find out how FLO-KLEAN can protect your equipment and save money write for free FLO-KLEAN bulletin to the Cuno Engineering Corporation, Dept. 394F, Meriden, Conn. F.3.3

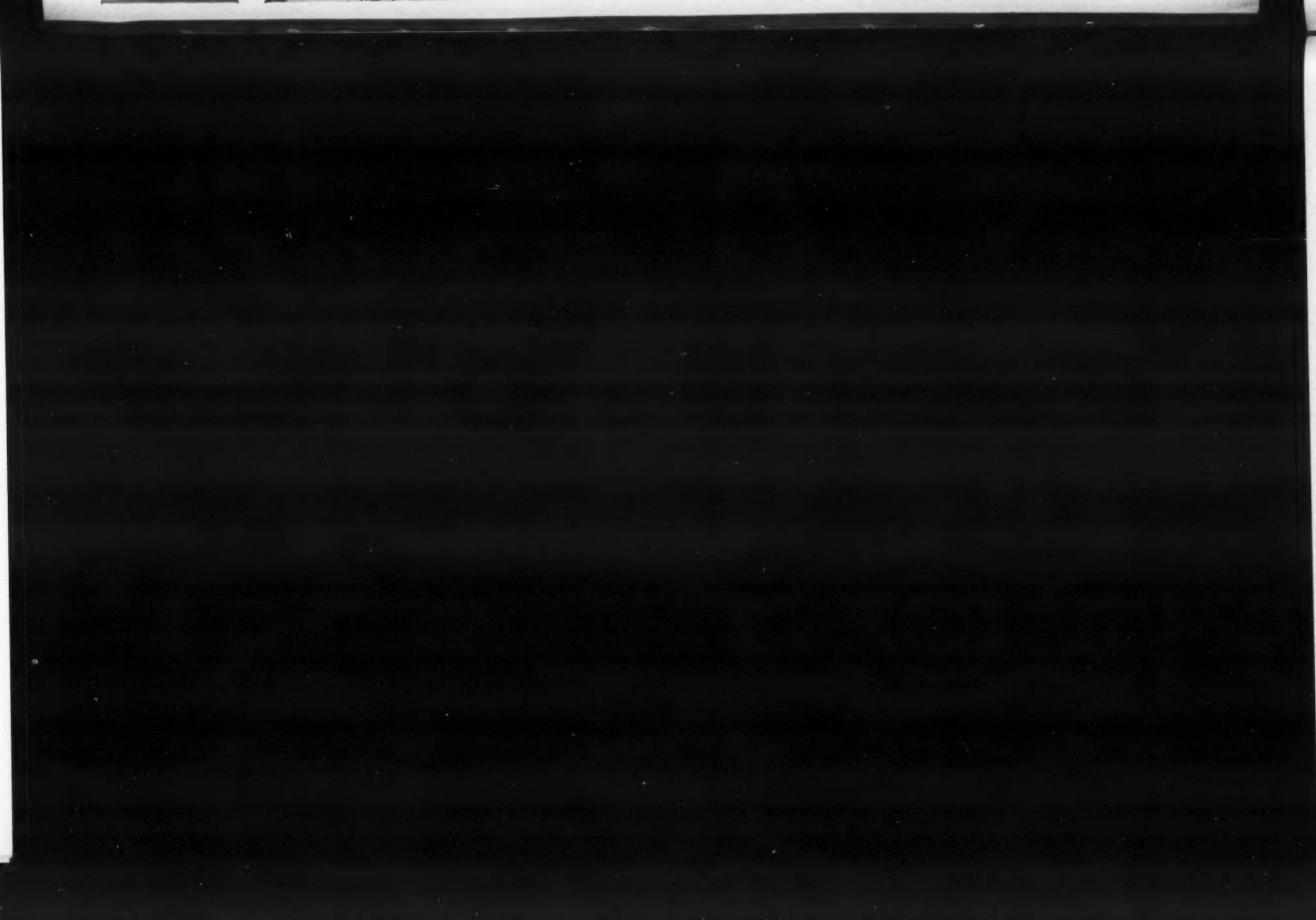
CUNO

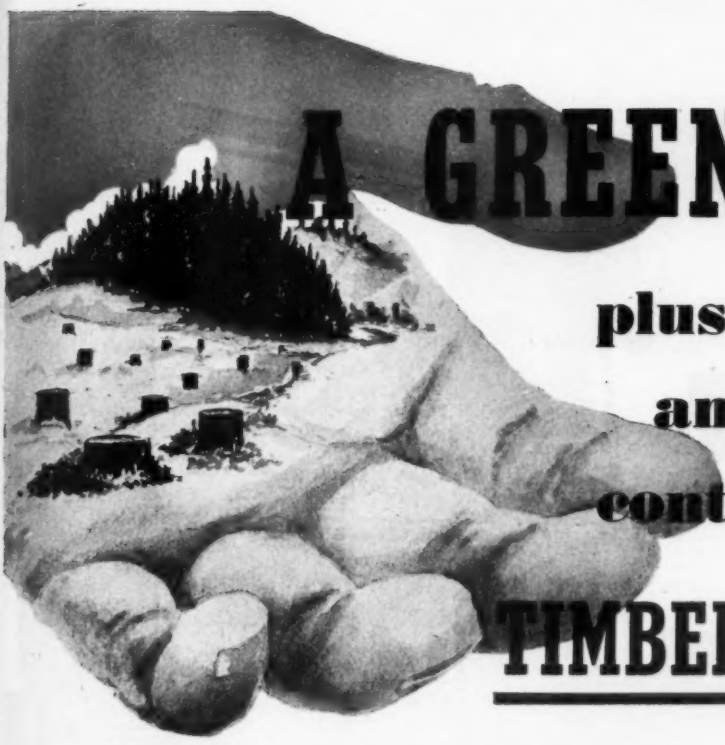
ENGINEERED FILTRATION

Removes More Sizes of Solids From More Kinds of Fluids

AUTO-KLEAN (disc-type) • MICRO-KLEAN (fibre cartridge) • FLO-KLEAN (wire-wound)







A GREEN THUMB

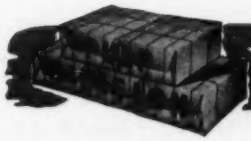
plus fire, insect and disease control assures

TIMBER as a CROP!

In the Weyerhaeuser long range timber growth plan, blocks of "parent seed trees" provide seeds for new growth trees which will supply a steadily increasing part of the harvest. As these second growth trees replace virgin timber, the science of tree growing will have to solve many new problems of forest management.

Looking to the future, Weyerhaeuser Timber requirements will be obtained from trees between 80 and 160 years old. To successfully accomplish this transition, Weyerhaeuser Forestry Research is constantly gathering more specific knowledge of tree growing habits and their relationship to fire, insects, disease and logging practices.

The soundness of the Weyerhaeuser sustained yield programs depends on the ability of its foresters to predict with reasonable accuracy the yield of these young forests. Based on these future growth figures, the productive capacity of the Pulp Division can be planned years ahead. As the quantity of the crops from these young forests increases, so will the quantity of Weyerhaeuser Sulphite and Sulphate pulps.

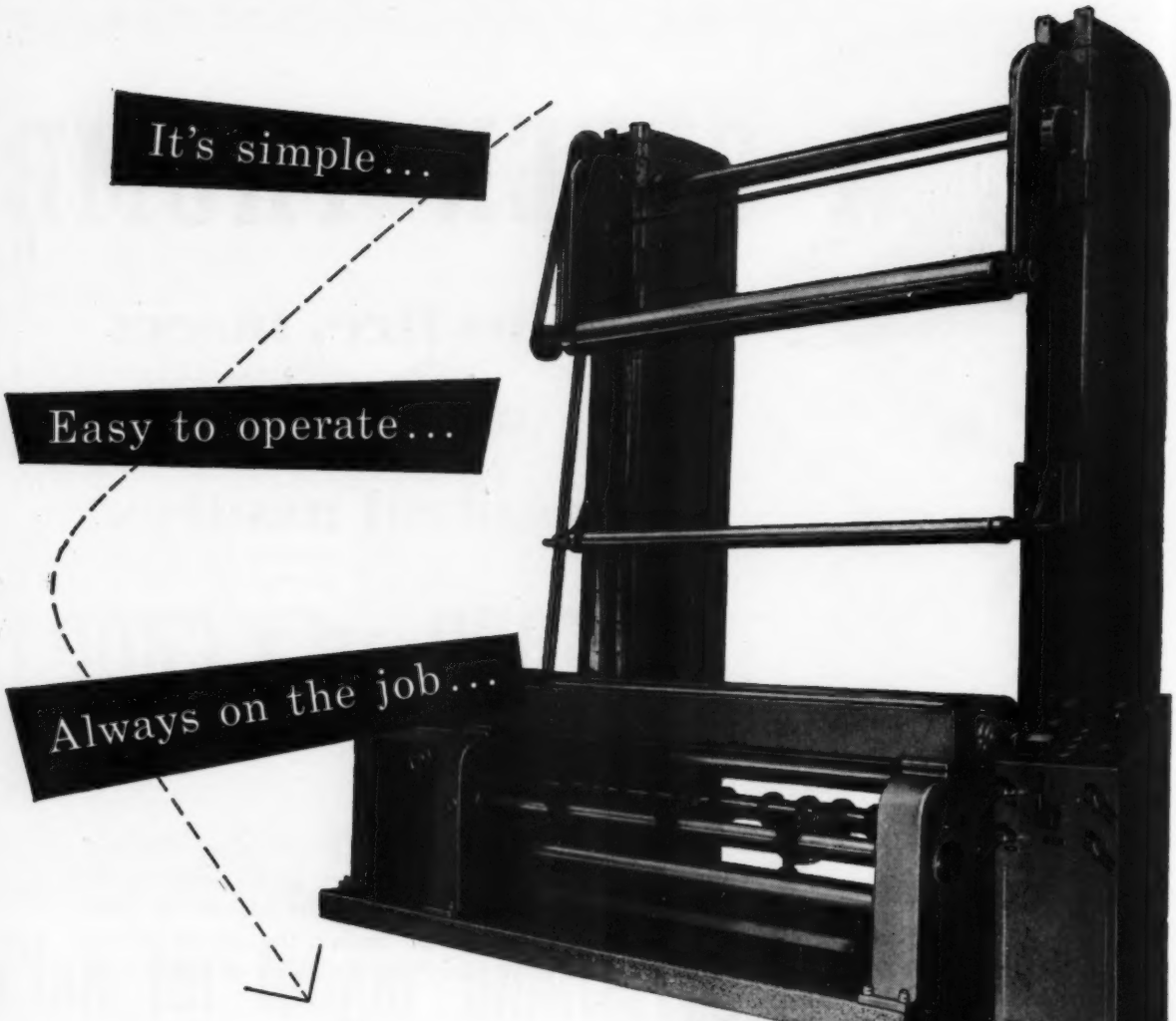


WEYERHAEUSER

It's simple...

Easy to operate...

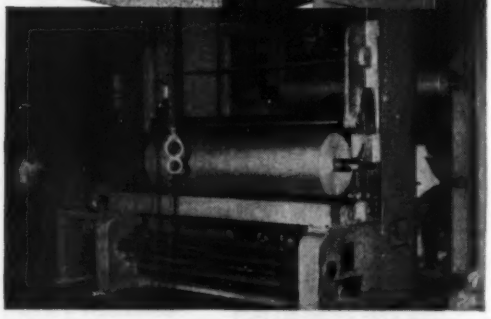
Always on the job...



This Manchester Rewinder and Slitter is as simple and easy to operate as your radio set. Note the centralized control feature—*the man at the "console" handles everything* except getting the paper on the winder drum.

It's a designer's dream . . . no gingerbread, no unnecessary working parts to cause trouble and maintenance expense. . . . All of which sums up to uniform tight rolls and clean cut edges with low labor and operating costs for *you*.

Compare the Manchester Rewinder and Slitter with any other machine of its size and you'll see what we mean. We'll be glad to give you additional information applied to your specific needs. Write us.



Here's a Manchester Rewinder and Slitter in service in a well-known Ohio paper mill. The owners say, "We are well satisfied with our new streamlined unit. It is doing everything you said it would do—and more."

• • • • • • • • • • •

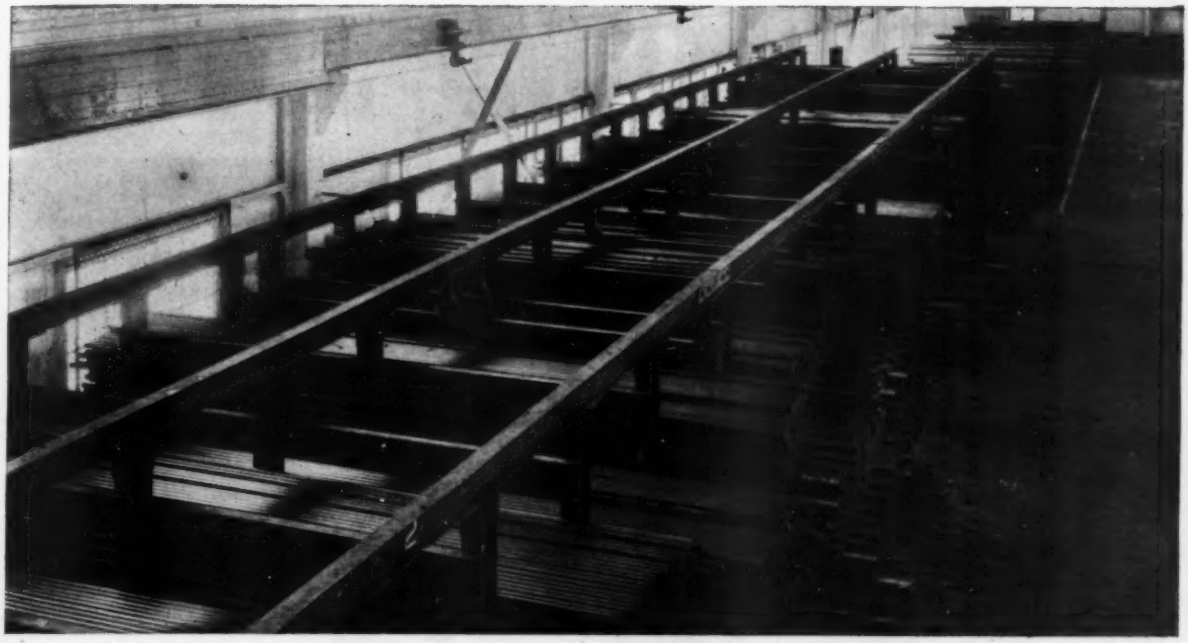
A Few Other Manchester Products

Drum Winders • Adjustable Shake Motion • Pope Type Reels Paper Machine Drives • Size Presses • Drilled Suction Press Rolls Drilled Suction Drum Rolls • Drilled Suction Couch Rolls • Cylinder Moulds • Complete Fourdrinier • Roll Grinding

THE MANCHESTER MACHINE COMPANY

1714 CENTRAL AVENUE • MIDDLETOWN, OHIO

SPECIALISTS IN PAPER MILL MACHINERY AND COMPLETE REPAIR SERVICE



=ORDER FOR 52100 TUBING RECEIVED TODAY.

WILL BE SHIPPED FROM MILL STOCK TOMORROW=

ORDER wear-resistant 52100 tubing today. We ship it tomorrow from our mill stock of one hundred and one sizes!

A high-carbon chrome steel, 52100 manufactured by the Timken Company, is through-hardening in moderate sections and can often be used in place of more expensive steels.

It can be heat treated to file hardness and tempered back to any desired point. And it's available in sizes from 1" to 10½" O.D., to fill many of your hollow parts needs: aircraft parts, ball bearing races, pump parts and plungers, collets, bushings, spindles, grinding machine parts and precision instrument parts.

As America's first producer of 52100 tubing, the Timken Company has unequalled experience that results in uniform high quality from tube to tube and order to order. Rigid quality control checks every step of production.

For immediate delivery of your less-than-mill-quantity orders, write, wire or call The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

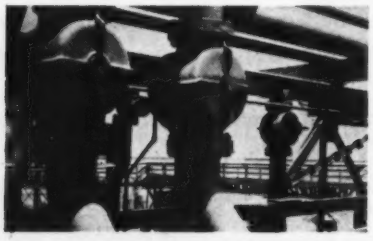
SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

Non-retarded straight-through flow

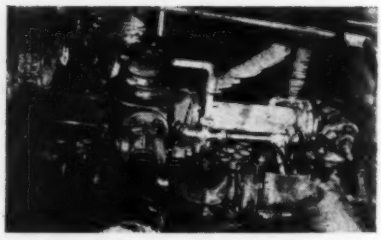
...is guaranteed by a.c.f.'s Round Port Valves because the valve opening is *exactly* the same size and shape as the pipe itself.
As a result you get full capacity flow of heavy viscous ladings, no loss in head pressure. Materials in suspension have no abrasive effect.

Full pipe area and the non-wedging effect of CYLINDRICAL Plug Design is also available in a.c.f. Rectangular Port Valves. It will pay to get all the facts about *both* before you buy. Call your nearby a.c.f. Representative now or write direct for information.

IN PETROLEUM AND GAS INSTALLATIONS a.c.f. Valves provide full flow with no pressure loss, fastest sure operation.



IN PROCESSING a.c.f. Round Port Valves are ideal for such materials as cement slurry with straight-through uninterrupted flow.



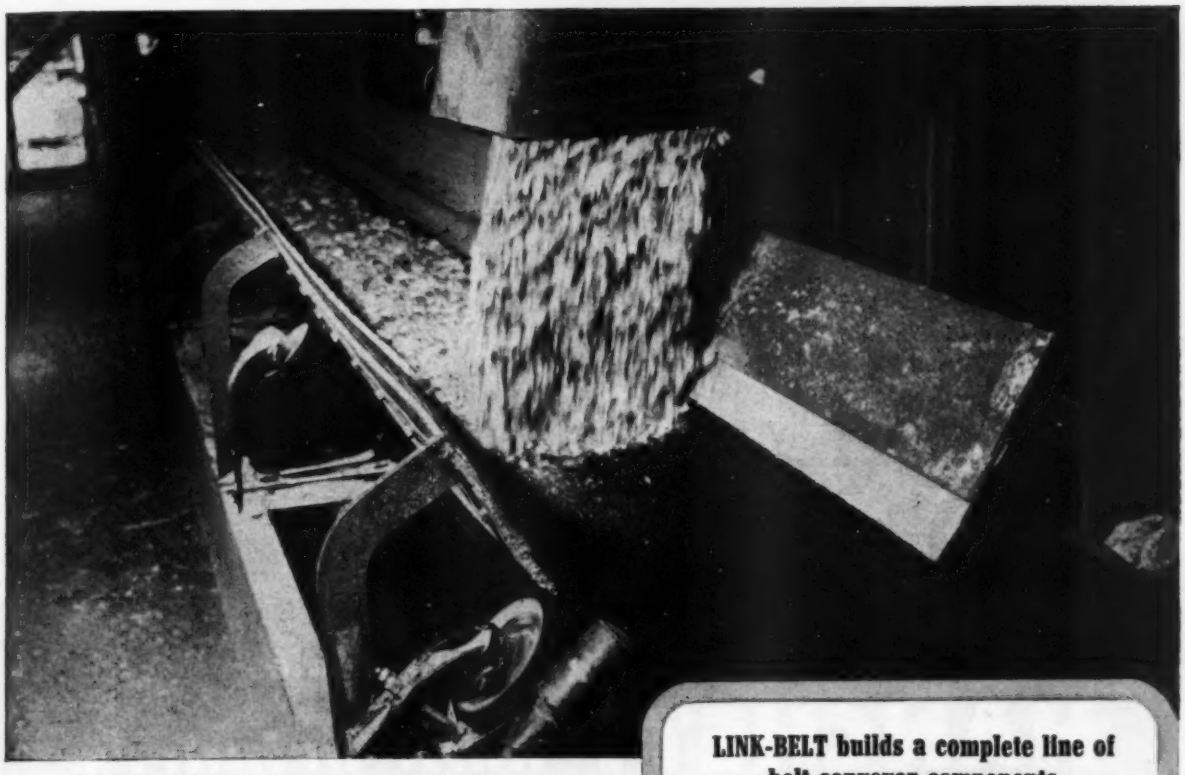
TWELVE YEARS OF SERVICE for these a.c.f. Valves handling hot asphalt is evidence of service-free performance.

a.c.f. CYLINDRICAL FULL PIPE AREA PLUG VALVES

Write for Catalog 4-PI, American Car and Foundry Company, Valve Division, 1501 E. Ferry Ave., Detroit 11, Michigan.

Representatives in 50 Principal Cities

TOTAL ENGINEERING



Link-Belt 45° idlers provide greater capacity for chips as they move by belt conveyor at this mill. Note belt-training idler.

It's your assurance of top efficiency with LINK-BELT belt conveyors

HERE'S how "total engineering" works for you when you use Link-Belt Belt Conveyors. First, Link-Belt conveyor engineers analyze your needs—then recommend the *right* components. In addition, Link-Belt can supply all related equipment — other types of conveyors, feeders, elevators, car dumpers and shakers. And Link-Belt will build your supporting structures and enclosures . . . install the job completely, if desired. Call the Link-Belt office near you for any engineering assistance you need.

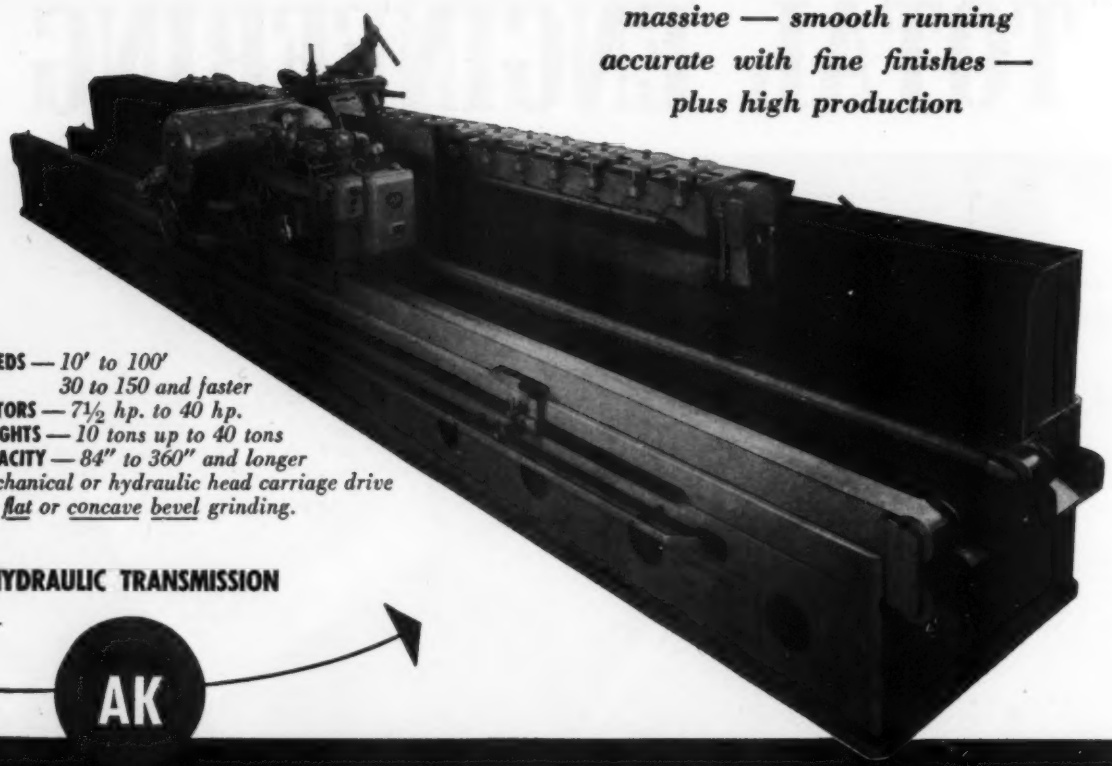
LINK-BELT

BELT CONVEYOR EQUIPMENT 15.280

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales offices in Principal Cities.

LINK-BELT builds a complete line of belt conveyor components

massive — smooth running
accurate with fine finishes —
plus high production



SPEEDS — *10′ to 100′*
30 to 150 and faster
MOTORS — *7½ hp. to 40 hp.*
WEIGHTS — *10 tons up to 40 tons*
CAPACITY — *84″ to 360″ and longer*
Mechanical or hydraulic head carriage drive for flat or concave bevel grinding.

HYDRAULIC TRANSMISSION

AK

for the pulp and paper industries

HANCHETT *knife grinders*

FOR GRINDING CHIPPER — HOG — BARKER PAPER TRIMMER — DOCTOR BLADES

GK

FULLY AUTOMATIC TABLE DRIVES
HYDRAULIC OR ELECTRICAL

SPEEDS — *10′ to 80′ per minute (faster if required)*
CAPACITY — *32″ to 184″*
abrasives — segmental or cylinder type grinding wheels

FINEST KNIFE EDGES

HANCHETT MANUFACTURING COMPANY
World's largest manufacturer of knife grinding and saw sharpening machinery
MAIN OFFICE — Big Rapids, Michigan **WEST COAST** — Portland, Oregon

HANCHETT GRINDERS

The Paper Industry

June 1953

Mid-Year Outlook for Pulp and Paper

The chart compiled and recently published by Marathon Corp. comparing consumption of paper and paperboard with population and national income shows a general parallel between national income and consumption of paper products. There is, however, one significant discrepancy in this relationship. While national income rose from 269 billion dollars in 1951 to 290 billion dollars in 1952, paper consumption in the United States dropped during that period from 31,900,000 tons to 30,000,000 tons. The year 1952 was, of course, a year of many uncertainties —the presidential election, vacillating Korean truce talks, and increasing competition shown by a recovered European pulp and paper industry. These are factors that have a habit of affecting trade adversely, not in a way as to actually upset the demand for pulp and paper products, but they do call for changes and readjustment in the pattern of trade and for a reorientation of markets, thus leading to a general reduction of trading activity until the new channels of trade and a new equilibrium are reached.

This new equilibrium apparently had been reached by the end of 1952. Trading activity in the first six months of 1953 has been so vigorous that our production and consumption of pulp and paper products may possibly exceed the 1951 levels.

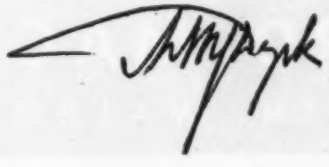
There is a great logic in the growth and development of an industry. This logic tells us that world consumption of paper and paper products can proceed only in one direction—that of gradually closing the gap and rising to the annual per capita consumption of about 400 pounds now enjoyed by the people of the U.S.A. The same logic tells us that the per capita consumption of 400 pounds by no means constitutes a maximum and that there are many potential uses for pulp and paper products not hitherto fully explored nor understood.

We need only look at the 7 billion dollar-a-year packaging industry, which constitutes an ideal outlet for pulp and paper products but which so far has not been deeply penetrated, to realize the magnitude of these potentialities.

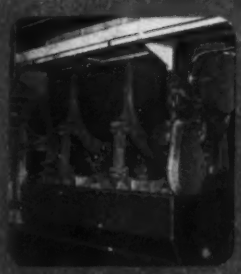
Attention is now focused on the improved properties of coated and laminated combination packaging films. Packaging films such as polyethylene, saran, cellophane, vinyl films, etc., show quite a few weaknesses when used singly. In combination films, for example, the oxygen resistance and printability of cellophane film has been combined with the strength, low temperature durability, and heatseal properties of polyethylene.

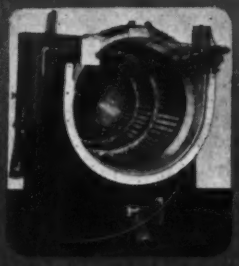
Moreover, combining the film with a paper base permits the use of conventional packaging equipment while at the same time retaining the full benefit of the practically tailor-made properties of combination films. Practically any type of conventional wrapping, forming or sealing equipment will handle these paper-plastic sheets.

The pulp and paper industry has not overexpanded. The potential uses of old and new products seem unlimited. So is the market. But it has to be developed and understood. It is not surprising that the most successful industrial establishments are those that carry on intelligent public information and market research programs.



Can You Pass This "SCREEN" TEST?





Do *your* BIRD SCREENS have the combination of large screening area, fine screen slots, gentle screening action and non-ferrous construction that is essential for meeting today's standards of quantity and quality paper production?

There are still some seven hundred Bird Screens in service that cannot fulfill these specifications because they are too old and out-of-date.

Are *your* BIRD SCREENS equipped with *Bird Oscillating Shower Pipes* to keep the screen slots clean and open and to use a minimum of shower water — far less than that required by ordinary showers?

Old type showers may be readily replaced by Bird Oscillating Showers which quickly pay for themselves.

Are *your* BIRD SCREENS equipped with *Dirtec Tailings Units* which handle up to two or three times the volume of tailings otherwise handled, assuring clean stock, high screening efficiency and no waste of good fibres?

Dirtecs (one per Screen) are easily and inexpensively applied to existing Screen installations to replace the old and far less effective auxiliary screens.

If your answer is "Yes" to all three questions you have a screening installation that will make better paper and more of it per day at lowest screening cost per ton.

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

The Paper Industry Current Comment

The president and the old pro . . . position strengthened . . . and dry milk

Four months of Mr. Eisenhower's four-year term as President have elapsed. Supporters of Mr. Eisenhower are appraising these four months as a period of accomplishment, while the opponents are being carefully critical of the Administration, realizing that premature attacks on policies might prove a boomerang when the public realizes that it takes time to get the machine out of the morass in which it has bogged down for 20 years.

The big question mark of inauguration day, Eisenhower vs. Taft, is answered. The "versus" has been taken out of the Republican dictionary, and while the two may not agree on every proposal facing the Administration, they are working as a team to eliminate intra-party controversy.

Out of the four months of sparring for position within each party and between the two parties, Chairman Daniel A. Reed of the powerful Ways and Means Committee of the House of Representatives has emerged as the strong man of the lower house. To use a sporting phrase, the old pro (he has been in Congress since 1918 and knows all the tricks of the political trade) is likely to be Mr. Eisenhower's chief headache on fiscal matters.

Two problems and opposition

Two problems, both with an important bearing on the prosperity of the paper industry, have placed the two in direct opposition in their views as to a national fiscal policy.

President Eisenhower in a radio broadcast on May 19 laid down his views on the tax problem of the nation, opposing any reduction in taxes at this time. Mr. Reed does not like the proposal and says he is ready to fight—"and when I fight, I fight," he is quoted as saying after the Eisenhower program was made public.

The Ways and Means Committee under the chairmanship of Mr. Reed has approved a bill to cut personal income taxes 10 per cent on June 30, instead of delaying the presently legal provision for this reduction to the end of 1953. Mr. Reed also wants the excess profits tax to go out of existence as now scheduled by law on June 30. He insists that Congress live up to the November campaign promises to cut income taxes and believes that by reducing the personal income tax and eliminating the excess profits tax the public will have sufficient more income to compensate in direct taxes through increased business activity.

This proposal affects the paper industry as well as many other industries by permitting corporations to distribute in increased dividends the funds now paid in excess profit taxes. Financial houses made a special point after the election of the greater attraction for investors in paper mill securities that would result from such increased dividends. While this affects other industries as well, it is only of recent years that paper mill securities became popular with the investment public, and these securities have been far more widely distributed among individual holders, as well as added to the portfolios of mutual funds, investment trusts and insurance companies.

Mr. Eisenhower, in his broadcast, asked the continuance of the excess profits tax and an extension of the present corporate income tax of 52 per cent, which present law would cut to 47 per cent in April. He advocated a continuance of the program to cut personal income taxes 10 per cent beginning in January 1954, instead of the Reed proposal to make the cut effective June 30, thus achieving a 5 per cent reduction for the entire 1953 year. Mr. Reed fears that a failure to cut income taxes as promised in the late campaign would throw the House of Representatives back into Democratic hands in the 1954 elections. Mr. Eisenhower's program is to begin a complete overhauling of the entire tax system in 1954, but says that the huge spending programs mortgaged over to his Administration by the outgoing Democrats makes it impossible to balance the budget without continuance of present taxes until his program for reduced national expenditures can be achieved. The nation's economic and military safety depends on financial security, he asserted.

Foreign trade

The other point on which President Eisenhower and Mr. Reed are in sharp conflict is the proposed extension of the Reciprocal Trade Agreement program. The President wants the present law extended for one year without change. A bill sharply debated in the Ways and Means Committee continues the present law but with provisions sharply restricting the power of the Administration to negotiate further duty rate reductions. These hearings were concluded soon after the paper industry representative appeared before the Committee approving the bill in principle but urging that a complete financial study be made of the entire tariff structure preliminary to a complete rewriting.

The Administration has countered the proposal to restrict further duty rate reduction negotiations by a pledge to make no new agreements during the year. Meanwhile, Mr. Eisenhower has sponsored the introduction of a measure to set up a commission to study the nation's entire foreign trade program, this commission to be composed of three

Note: Map Supplement May 1953 Issue

An additional saturation area not shown on the Pulp and Paper Map of the Southern States centers around Mill No. 40 in North Carolina and measures about 2 inches in diameter. J. E. Sirrine Co. also regrets that Johns-Manville Products Corp.'s mill at Natchez, Miss., producing 50 tons of sulfate and 200 tons of groundwood pulp, was not included on the map.

BLAW-KNOX DIGESTERS
can "stomach" anything!

WHEN you specify Blaw-Knox to design and fabricate digesters for any purpose you avail yourself of the kind of experience and manufacturing methods which assure complete satisfaction for years to come.

Blaw-Knox was one of the pioneers in the digester business, and has developed a wide range of modern equipment for processing Paper, Cotton, Wood and Organic Materials. To be better acquainted with our work in this field *write today for Bulletin No. 2403.*

• *Digesters in any capacity*

BLAW-KNOX

BLAW-KNOX COMPANY
Blaw-Knox Equipment Division
Pittsburgh 22, Pa.

men each from the House and Senate named by the speaker and vice president, respectively, and five appointees by the President, of whom two would be from outside government circles.

The sharp conflict between Rep. Reed and the President is shown by the fact that this proposal was routed, not to the Ways and Means Committee where it normally would go, but to another House committee. Rep. Reed considers this a slap at him and threatens to bottle up Administration legislation in his committee in retaliation.

This struggle in Washington is national in scope, but its effect on the paper industry is direct and vital. The industry's opposition to the Reciprocal Trade Agreement program is based on the charge that it has been the chief victim of duty rate reduction negotiations, with its duty rates cut more sharply than those of any other industry.

A better atmosphere

That the overall operation of the new Administration is creating a better atmosphere for industry was again evidenced during the month by steps by the Federal Trade Commission to make its functioning more precise, and to make it possible for industry to secure conferences for the correction of abuses without being haled into court on mere suspicion of price fixing.

A strengthening of the paper industry is evident from various statistics now becoming available. First quarter production of paper and paperboard was the largest tonnage in history except for the first and second quarters of 1951. Meanwhile, there is a distinct upward trend shown by earnings reports for the first quarter in a considerable portion of the industry. The first half-year earning should top the levels established in the first half of 1952, despite sharp competitive conditions now existing.

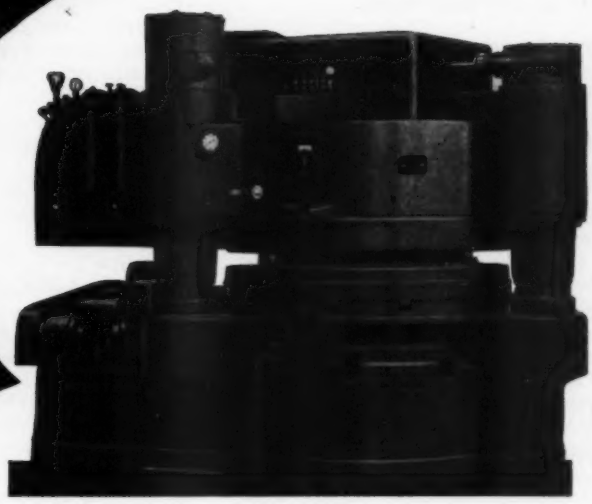
And dry milk . . .

The United States Department of Agriculture has announced a new program for the purchasing of non-fat dry milk solids in multiwall paper bags, with a price per pound slightly less than that paid for the same product when packed in fiber drums. About 10,000,000 pounds of dry milk will be so packed in the present price support program for this dairy product.

Financial Reports

Pending the development of the Administration's 1953 fiscal policy, the nation's securities markets were comparatively inactive, with some tendency toward lower quotations as it appeared possible that the excess profits tax would be continued through the year. While paper mill securities followed the gen-

ANOTHER BIG REASON for installing A CURLATOR



14 LEADING MILLS ARE NOW CURLATING THEIR PULP

Since the Curlator was first announced in 1949 fourteen leading pulp and paper mills in the United States and Canada have installed them. Five mills have made multiple installations (one mill having eight Curlators). Proof in itself that Curlation improves paper qualities, saves wood, cuts costs. If your mill isn't Curlating pulp it will pay you to investigate, for only a Curlator can give you all these benefits:

INCREASED YIELD OF 5% is common in many normal pulps, since Curlation eliminates No. 2 pulp and fine screen rejects... converts shives and fiber bundles into No. 1 pulp. 65% yield in news sulphite is thoroughly practical.

INCREASED TEARING STRENGTH is imparted to paper made from Curlated pulp because fibers are given a permanent bend and twist. Tearing strength has been increased up to 60%.

FREENESS is retained because Curlation can not cut fiber. Curlator patented action rolls fiber and fiber bundles under pressure . . . imparts a permanent bend and twist.

WRITE for more detailed information. See the finer paper that can be made from your own pulp.

CURLATOR+ Corporation
EAST ROCHESTER, NEW YORK

+T.M. Reg.—Curlator Corporation, East Rochester, New York

Canadian Representative—Homad Services, Ltd., Montreal

eral trend of the market, sales were in less than the usual volume.

Net incomes

A. P. W. Products Co.—Deficit for the first quarter of 1953 was $25,949, as compared with a profit of $14,718 in the first quarter last year.

Albemarle Paper Mfg. Co.—Net income for the year ended March 31 was $642,111, as compared with $1,094,868 for the previous fiscal year.

American Writing Paper Corp.—Net first quarter income was $120,453, as compared with $88,295 in the same quarter of 1952.

Bowater's Newfoundland Pulp & Paper Mills Ltd.—Net profit for the year ended September 30 was $4,617,474, compared to the previous fiscal year's $4,069,829.

Continental Diamond Fibre Co.—Net income for the three months ended March 31 was $221,793, as compared with $194,858 in the same quarter of 1952.

Crystal Tissue Co.—Net income for the first quarter was $62,281, as compared to a deficit of $3,867 in the same quarter of 1952.

Dixie Cup Co.—Net first quarter income was $509,059, as against $470,593 a year ago.

Eastern Corp.—Net income for the first 1953 quarter was $190,396, as compared to $240,369 for the first quarter of last year.

Elk Falls Co.—Consolidated net loss and deficit for the six months ended December 31 was $497,549 (company began operations June 10, 1952).

Glatfelter Co., P. H.—Net first quarter income was $270,616, as compared with $251,325 in 1952.

Hinde & Dauch Paper Co.—Net income for the first quarter was $897,372, as against $754,485 a year ago.

St. Regis Paper Co.—Net income for 1952 amounted to $12,701,977, as against $16,796,034 in 1951.

Scott Paper Co.—Net first quarter income was $2,711,053, as compared to $2,527,327 a year ago.

Sorg Paper Co.—Net first quarter income was $99,956, as compared with $25,457 in 1952.

Stone Container Corp.—Net profits for the first three months were $347,800, compared with $375,800 a year before.

Sutherland Paper Co.—Net income for the first quarter of 1953 was $707,108, as compared to $569,439 in the same quarter of 1952.

Union Bag & Paper Corp.—Net first quarter income was $2,691,568, as compared to $2,642,392 in the same quarter of 1952.

United Wallpaper Inc.—Net income for the nine months ended March 31 was $83,780, compared with a deficit of $458,140 in the same 1952 period.

Watervliet Paper Co.—Net 1952

BLACK LIQUOR EVAPORATION PROBLEMS?

Let Swenson Engineering Help You Solve Them!

Take the *proved* way to more efficient black liquor evaporation . . . call on Swenson engineering! Swenson L.T.V. Evaporators were the *first* of this type to be adapted to the job. They provide lower cost operation . . . plus *all* the benefits of Swenson's specialized experience in this field.

Write for complete information today.

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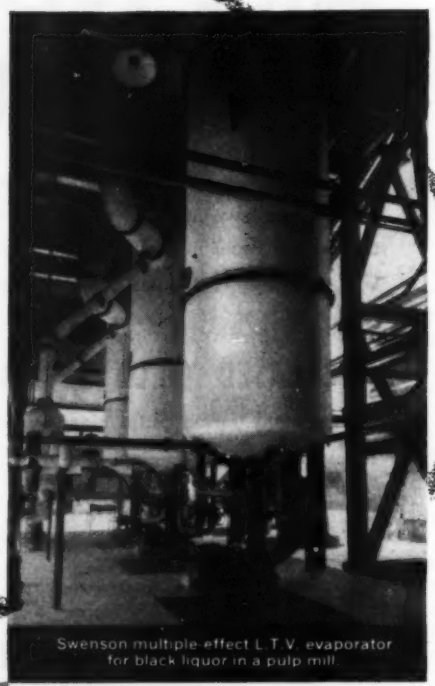
Evaporators • Pulp Washers • Filters • Causticizers • Digester Blow Condensers • Surface Condensers • Turpentine Condensers



Swenson multiple-effect L.T.V. evaporator for black liquor in a pulp mill.

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profit was $400,642, compared with $457,033 in 1951.

Weyerhaeuser Timber Co.—Net income for 1952 was $36,706,577, as compared to 1951's $39,945,708.

Whitaker Paper Co.—Net income for 1952 was $698,378, compared with $750,475 in 1951.

Paper mill corporate changes

Albia Box & Paper Co. of Troy, N.Y., has been sold at auction to John D. Greco, head of New York Fibre Corp.

Crown Zellerbach Corp. has announced that the owners of more than 320,000 shares of stock of St. Helens Pulp & Paper Co. have accepted the offer made by C-Z to exchange shares of its common for those of St. Helens; such acceptances constitute more than the minimum 80 per cent of outstanding shares of St. Helens required as one of the conditions to make the offer effective. . . . Also, C-Z has made a formal offer to acquire Canadian Western Lumber Co. Ltd. by exchanging one share of Crown for each three shares of Canadian Western; the offer is subject to the acceptance of not less than 75 per cent of Canadian Western's outstanding shares and expires June 15. . . . Crown Zellerbach has reported to the San Francisco Stock Exchange that it retired 14,112 shares of the $4.20 cumulative preferred stock in the 12 months to March 26; there remained outstanding on that date 312,290 shares.

New York Stock Exchange—Stocks

Closing Prices

	May 19, 1953	April 20, 1953
A.P.W. Products	3⅞	* 4¼–4⅜
Celotex	17⅞	18½
Same Preferred	* 16¾–16⅝	* 16¾–16⅝
Certain-Teed Products	14⅛	14⅛
Champion P.&F. Co.	* 28⅝–29¼	* 29⅝–30¼
Same Preferred	* 95¾–96	99¼
Chesapeake Corp.	* 29¼–30	* 29–30
Continental Diamond	11⅞	12
Container Corp.	40¼	41¼
Same Preferred	100¼	*100¼–101¼
Crown Zellerbach	29½ (new)	60½
Same Preferred	93¾	98
Dixie Cup	37	36
Eastern Corp.	16	* 17–17½
Robert Gair	18½	18⅜
Gaylord Container	26¼	27⅞
Hammermill	15¼	15
International Paper	52⅛	50⅛
Same Preferred	* 96–98½	* 98¼–101
Kimberly-Clark	40¾	41⅞
MacAndrews & Forbes	41½	* 42½–43¼
Marathon	19½	20⅜
Masonite	20¾	21⅞
Mead Corp.	* 26¾–26¼	26½
Same Preferred	* 92–94½	* 94–94¾
National Container	10¾	9⅞
Rayonier, Inc.	28	28¾
Same Preferred	32½	33⅜
Scott Paper	57⅞	56⅜
Same 3.40 Preferred	87	* 86–87½
Same $4 Preferred	100	* 99–101
St. Regis Paper	22⅛	22⅝
Same Preferred	94	* 94¼–96
Sutherland Paper	27	29¾
Same Preferred	*105½–106½	106½
Union Bag & Paper	46⅝	46⅝
United Board & Carton	* 14½–15	14⅞
United Wall Paper	* 2⅝–3	3
Same Preferred	* 25½–26⅞	* 25⅝–27
U.S. Gypsum	111⅝	110⅝
Same Preferred	*160–164	*165–169
West Virginia P. & P.	* 71–72	* 72½–74
Same Preferred	*106⅝–107	*107–108

New York Stock Exchange—Bonds

Celotex 3½%	.....	.....
Champion P.&F. Co. 3%	.....	.....
Mead Corp. 3%	.....	.....

American Stock Exchange—Stocks

Am. Writing	10⅝	.....
Brown Co.	9⅜	9⅞
Brown Co. $5 Preferred	90⅝	90
Same Preferred	49⅝	48½
Great Northern Paper	53⅝	54⅝
Puget Sound	29	.....

*Closing Bid and Asked Prices

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Peering far into the future, the giant paper industry foresees its enormous needs . . . maintains an army of foresters, millions of acres of timberland, to perpetuate vital national resources. Vast-scale forest programs range from seedling nurseries to scientific harvesting. *Every-one* uses paper . . . relies on it, benefits from it in countless ways! Safeguarded by reforestation, paper is here *for good!*

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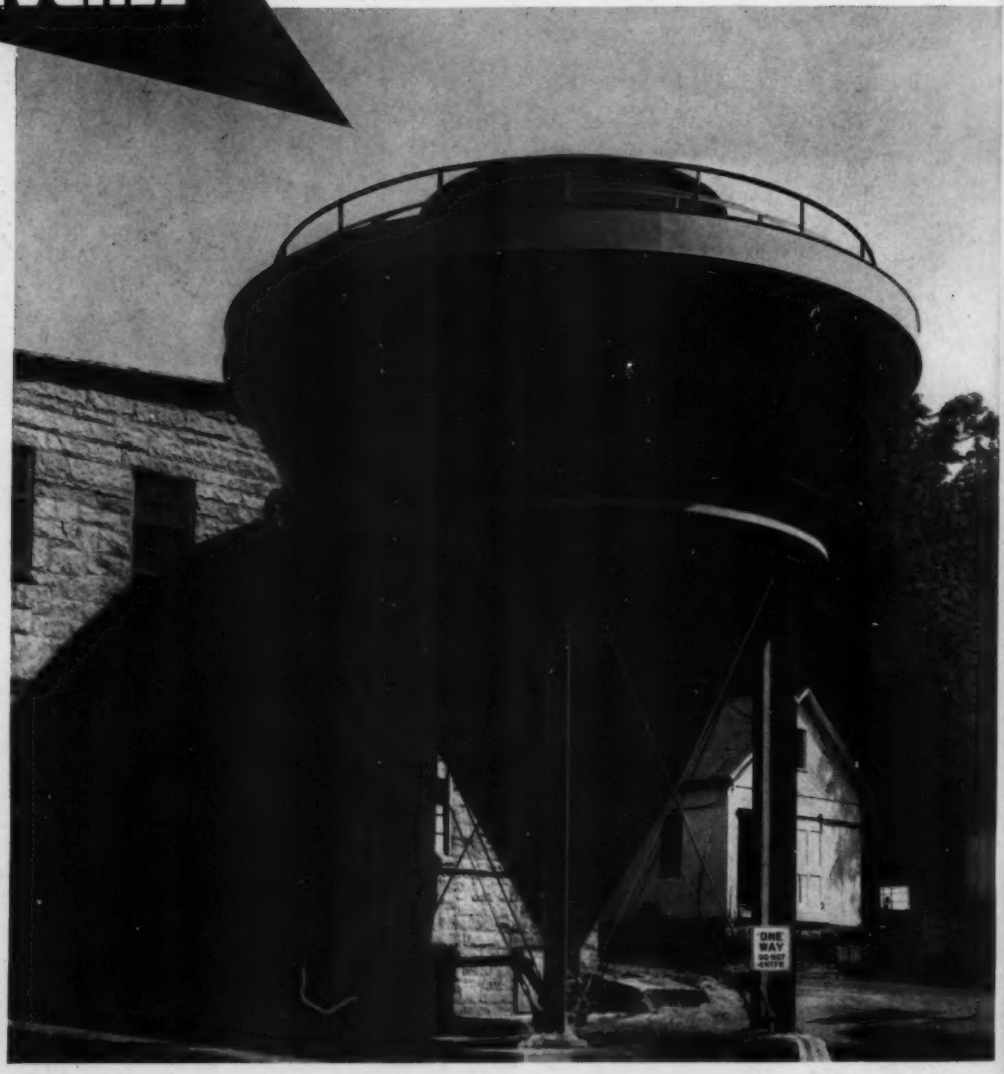
Reclaims Pulp Fibers from White Water
Helps Prevent Stream Pollution



Cut your operating costs by using the Marx Saveall—a large settling unit that removes pulp fibers from white water. In addition to reclaiming these valuable solids, Marx Saveall processing permits the re-use of white water and helps prevent stream pollution when paper machine effluent is not re-used. Write our nearest office for information on the Marx Saveall.

36-ft. diam. Marx Saveall installed for the Robertson Paper Box Company at Montville, Connecticut.

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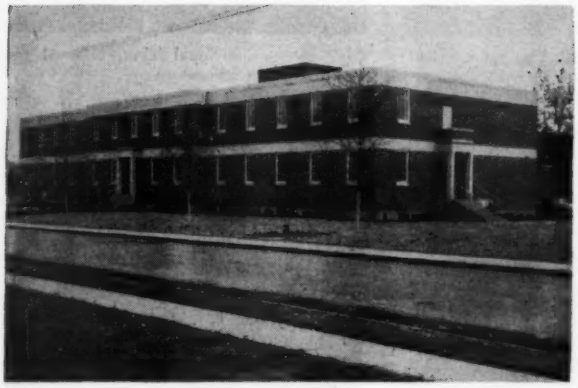
Atlanta, 3.....2143 Healey Building
Birmingham, 1.....1511 North 50th Street
Boston, 10.....1026—201 Devonshire Street
Chicago, 4.....2445 McCormick Building
Cleveland, 15.....2267 Midland Building
Detroit, 26.....1566 Lafayette Building
Havana.....402 Abreu Building
Houston, 2.....2143 C & I Life Building
Los Angeles, 17...1559 General Petroleum Building
New York, 6.....3350—165 Broadway Building
Philadelphia, 3...1653—1700 Walnut Street Building
Pittsburgh, 19.....Alcoa Building
San Francisco, 4.....1547—200 Bush Street
Seattle, 1.....1327 Henry Building
Tulsa, 3.....1651 Hunt Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. In Canada: HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

The Paper Industry News of the Industry



EXTERIOR VIEW OF Mead Corp. research laboratory that was recently dedicated at Chillicothe, Ohio; the two-story brick office and laboratory building and the pilot plant cost $1,000,000

FOUR "OUTSIDE" DIRECTORS of Mead watch a demonstration at the opening of the laboratories; they are (l to r) E. T. Gardner, Charles S. Cheston, Robert H. Lee and Charles F. Kettering

Mead Dedicates $1,000,000 Research Laboratories at Chillicothe

THE MEAD CORP.'S new $1,000,000 research laboratories at Chillicothe, Ohio, were dedicated in special ceremonies April 29. Charles F. Kettering, a Mead director, inventor and former vice president of General Motors Corp., made the principal address.

The modern laboratories are housed in two buildings. A two-story brick office and laboratory building in the Georgian architectural style is in harmony with the old Chillicothe architecture. Offices line the north side of the structure, with laboratories directly across the corridor. To the rear of the office and at right angles to it is the pilot plant building that houses the heavier experimental equipment.

The buildings provide larger, better equipped, and more flexible laboratory and office space. Labs are piped for vacuum, steam, hot, cold and distilled water, and gas and are wired for electricity at 550, 220, 110 volts ac and 230 volts dc. All air is exhausted outside and fresh conditioned air continuously supplied. An electrostatic precipitator was supplied by American Air Filter Corp.

The main building is 166 by 54 ft. Connected to it by a passageway is the pilot plant structure, a single-story, high-roof building 150 by 102 ft. The latter encloses 15,630 sq. ft. of space, while the offices and laboratories boast 8,980 sq. ft. on each of two floors.

Modern equipment

Six offices and four laboratories, in addition to a spacious lobby and a conference room, are located on the first floor. On the second floor space is provided for five offices, four laboratories, and two conference rooms that can be converted into a single large area by means of folding doors. At the east end of the second floor is the technical laboratory. The building is of modular construction, and all laboratory walls and furniture are designed to be readily moveable. Although eight laboratories are provided in the original layout, the same space can be made into as many as 21 by rearrangement of walls and equipment.

In the basement are located storage rooms, shower rooms, air conditioning equipment, a photographic darkroom, a press room for testing the printing qualities of various papers, two humidity rooms where temperature and humidity are controlled to make accurate testing possible, an optical testing room, a shop for making glass laboratory equipment, and a fire proof vault for the storage of records.

The interior of all laboratories and corridors is of glazed tile, while office walls are plaster with wood wainscoating. Asphalt tile floors are used throughout.

The Research Department has been growing steadily in recent years and now numbers almost 100 personnel. In the new location it will be possible to install needed additional equipment and to permit greater efficiency in all phases of the work. The laboratories serve all divisions of the firm. Work is under the direction of R. H. Savage, vice president in charge of research; Rudolph Griesheimer, director of research, and John Redd and Edwin Flinn, assistant directors of research.

Opening ceremonies

To symbolize the opening of the laboratories, Miss Marianna Mead, daugh-

NEWS HIGHLIGHTS

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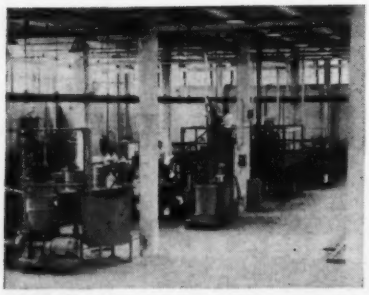
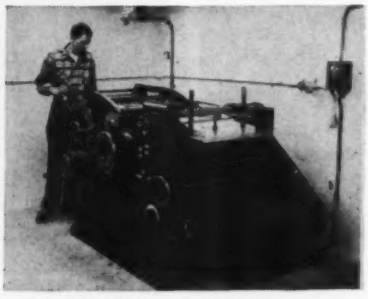


EXPERIMENTAL pulping and papermaking equipment at the pilot plant

CORNER of pilot plant at Chillicothe, showing sheet-making equipment

ONE of the individual laboratories at the Mead research laboratory

TECHNICAL library at laboratory; 5,000 books are available



POLY-AUTOMAT press installed for experimental printing

AIR IS FILTERED through this electrostatic precipitator

ter of George H. Mead, honorary chairman of the board, "blew" an experimental digester and began a series of experimental cooks on high-yield pulping. "High-yield pulping," Mr. Savage explained in introducing Miss Mead, "can be important to the economy of our company, and more, to the conservation of our forest lands. Beginning this new series of cooks is symbolic of the work we will undertake. . . ."

Urging the young scientists of today to look well into the future of research, Mr. Kettering declared that, "the results of research must be economic or they're not worth anything. . . . Every time you build a new laboratory you open new roads. Laboratories don't take the place of thinking, but when a laboratory is built around a definite objective, with the idea of solving specific problems, as this one, its success is almost assured. . . . This laboratory will be successful if it helps improve the profit of the company."

Directors other than company officers who attended the ceremony included Charles S. Cheston of Philadelphia, a director of Philco Corp. and Monsanto Chemical Corp.; Robert H. Lee of Drexel & Co., Philadelphia; E. T. Gardner, president of Gardner Board & Carton Co., and Mr. Kettering.

Scott Plans Second Machine on West Coast

Scott Paper Co. has made plans to start building a second paper machine on the West Coast, according to Raymond C. Mateer, executive vice president. He spoke recently at cornerstone laying ceremonies to mark the construction of the firm's first paper machine at Everett, Wash.

Mr. Mateer indicated that the cost of the first machine installation, which includes a building and converting equipment, will exceed $16,000,000.

Construction of the paper mill was started several months ago directly adjacent to Scott's large bleached sulfite pulp mill. The pulp mill and its substantial timber holdings were operated for years as Soundview Pulp Co.

Speaking about the plans for another paper machine at the same location, Mr. Mateer said that, "if our present plans carry through, this second machine will be installed and operating shortly after the start-up of the first machine in January 1954." He spoke enthusiastically about the broadened opportunities provided by the merger with Soundview and of the "cordial" relations that have been established between the personnel of the two firms.

Mr. Mateer and U. M. Dickey, Scott vice president and senior member of the board of directors on the West Coast, presided jointly at the ceremonies.

Ketchikan Plans Use of Magnesium Oxide Process

Ketchikan Pulp Co. will employ the recently perfected magnesium oxide process at the new Ketchikan mill site at Ward Cove, Alaska. The $46,000,000 pulp venture is a joint project of Puget Sound Pulp & Timber Co. and American Viscose Corp.

The MgO process is well established, according to Fred G. Stevenot, chairman of the board of directors of Puget Sound and a member of the board of Ketchikan. It has been brought to a successful practical use at the Weyerhaeuser Timber Co. plant at Longview, Wash.

Principally, the MgO process eliminates stream pollution. Additionally, it recaptures valuable chemicals that otherwise would have to be replaced. It has been estimated that the process recaptures 70 per cent of the sulfur. It is a self-perpetuating or endless chain method in which the waste sulfite liquors are recovered for fuel for the generation of steam and power.

Three firms contributed years of research and experiment to the perfection of the process: Howard Smith Paper Mills Ltd., The Babcock & Wilcox Co., and Weyerhaeuser. B&W manufactures the equipment and owns the process rights.

Basis of the method

Basis of the process is the substitution of MgO for calcium chloride used to break down the wood chips in the digester system. Chemicals recovered are magnesium oxide and sulfur dioxide, which are reused in the digesters. Side by side with the recovery of chemicals is the production of heat and

energy which supply a large part of the necessary power for the operation of the sulfite mill.

These two goals are achieved in a seven-stage cyclical process in which all waste cooking liquor is evaporated and burned, and the residual dust and gas is transformed again into a strong acid for reuse in cooking the chips.

Precipitator Installations Planned by C-Z at Lebanon

Precipitator installations designed to prevent cinders from escaping its Lebanon, Ore., paper mill stack have been approved by Crown Zellerbach Corp., it was announced recently by B. C. Smith, resident manager. The project will cost approximately $80,000. Equipment is to be ordered as soon as final engineering plans have been completed.

"We are confident that the new cinder collection and disposal unit, which is a cost item with no return to the mill, will effectively eliminate cinders that are caused by the burning of hog fuel in the boilers," Mr. Smith declared. "Experimenting is in its final stages, and fabrication of the unit will require about six months."

A new stack will be built and the precipitator unit installed between the mill boilers and the stack. Cinders will be collected by mechanical means and blown back into the boilers to be burned. About 150 more horsepower will be required because of the new draft fans that are part of the installation.

C-Z Wins Approval for St. Helens Merger; Outlines Plans

Permission was officially granted late in April for Crown Zellerbach Corp. to acquire control of St. Helens Pulp & Paper Co. of St. Helens, Ore. Shortly thereafter an Oregon circuit court denied an injunction against directors and voting trustees of St. Helens to restrain them from proceeding with the proposed acquisition.

The St. Helens group that was opposing the stock transfer required to merge the two firms had testified at a California hearing that it considered such a transfer in violation of the anti-trust laws.

The denial of an injunction leaves the trustees without restraint by the court and free to proceed with the exchange of St. Helens and C-Z stock should 80 per cent of the voting trust certificate holders approve. Deadline for such action was to be May 22, but C-Z had been granted an option to extend the exchange period to June 5. (See page 304 for later news.)

However, it has been revealed that the Federal Trade Commission is investigating the proposed acquisition. Judge Lowell Mundorff of the Oregon circuit court, after ruling that his court has no jurisdiction over anti-trust litigation, took account of the interest shown by the FTC, saying "it is an administrative agency specially set up by Congress for the purpose of dealing with problems such as this and which presumably has expert knowledge in regard to the proper application of the Sherman and Clayton acts."

C-Z and St. Helens directors have signed a memorandum of intent to make the transfer if legal requirements are fulfilled and at least 80 per cent of the St. Helens stock is transferred. The exchange would be on the basis of one share of C-Z stock for each 1-1/6 shares of St. Helens.

Expansion planned

J. D. Zellerbach, C-Z president who was called to testify at a hearing staged by the California Corporations Commissions, declared that there would be some effect on competition. He said that the acquisition of timber holdings of St. Helens would not only complement but would also supplement C-Z's holdings. He pointed out that St. Helens has substantial holdings of hemlock, spruce and other high-grade species in which his firm is somewhat deficient.

If the stock exchange is consummated, Mr. Zellerbach continued, a major reconstruction program now underway at St. Helens will be completed. The $8,000,000 expansion project calls for the modernization of facilities and an increase in capacity.

He explained that his firm will continue to serve St. Helens' present customers, and—on completion of the building program—C-Z will have additional tonnage for its own immediate market requirements.

Crown Zellerbach is negotiating a similar stock exchange with Canadian Western Lumber Co. of British Columbia. Mr. Zellerbach declared that if this transfer is consummated, all benefits and advantages to the company would inure to stockholders of St. Helens and Canadian Western who accept the exchange offers.

NEW PROCESS CONTROL laboratory at Falls Paper & Power Co., Oconto Falls, Wis.; Donald Hickey is shown using some of the new equipment; the expanded facilities permit more complete coverage of mill processes; renovation, according to a spokesman for the firm, raises the level of lab performance to conform to Scott Paper Co. standards; Falls P & P is a wholly owned Scott subsidiary

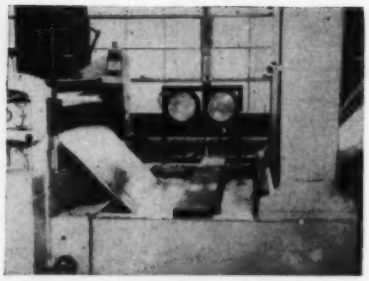
National Gypsum Announces $18,000,000 Program

Melvin H. Baker, chairman of the board of National Gypsum Co., told stockholders at their recent annual meeting that the company would spend $18,000,000 for improvements in the next two years.

In an optimistic address, he said the trend of the nation's economic levels will continue upward in the long run. He called the growth potential "unlimited" for the next ten years. Citing National Gypsum's sales growth from $22,000,000 to $100,000,000 over the past decade, he said that he saw no reason why the trend should not continue.

National Gypsum recently broke ground at Tonawanda, N.Y., for its new $1,000,000 research center. The end of the year has been set as the goal for completion of the structure, which will provide 47,200 sq. ft. of working space.

The center will employ about 100, mostly technical personnel. William H. Harding, director of research and as-



WAXING AND WATER finish sections of new 84-in. waxing machine recently installed at Minerva Wax Paper Co. in Minerva, Ohio; the machine is a product of the Dilts Machine Works Division of The Black-Clawson Co.

sistant to the president, will be in charge. The new unit will engage in fundamental research in product development and technical service for company plants.

River Raisin to Build Ohio Box Plant

River Raisin Paper Co. of Monroe, Mich., will build a $1,000,000 plant for the production of corrugated paper boxes in the Sharonville area of Hamilton County, Ohio. A tract of 5½ acres has been acquired about 10 miles north of Cincinnati.

The plant will be a brick and steel structure measuring 240 by 350 ft. with an office wing and separate power plant. More than 90,000 sq. ft. of floor space will be provided. Employment will be about 125.

Expansion Notes

Hammermill Paper Co.
of Erie, Pa., was to take delivery in May of a paper machine acquired from Dexter Sulphite Pulp & Paper Co. of Dexter, N.Y. There are no plans for early installation of the equipment. The machine was purchased by Hammermill 18 months ago, and it has remained crated in storage in Dexter.

Simplex Paper Corp.
of Adrian, Mich., will build a $300,000 manufacturing plant in Crossett, Ark., in the near future. The plant will produce waterproof papers from southern kraft paper laminated with asphalt.

Coos Bay Pulp Corp.'s
plant at Empire, Ore., will be modernized at a cost of $1,000,000. Directors of Scott Paper Corp. have approved expenditures for a new barking plant, new chipping and chip storage facilities, and general modernization.

P. H. Glatfelter Co.,
Spring Grove, Pa., is engaged in an expansion and improvement program for its pulp making facilities. The project includes an increase in the present digester output and necessary auxiliary equipment for handling the increased production, the installation of modern liquor making and recovery equipment and the modernization of the bleachery to conform with the broke quality requirements of the firm's diversified output.

Kimberly-Clark Corp.
of Neenah, Wis., has accepted bids for construction of a new paper storage warehouse at its Kimberly mill. The structure will be 300 by 260 ft. and 50 ft. high. It will have a basement, main floor, and partial mezzanine. Construction was expected to start in May.

Jackson Box Co.
of Norwood, Ohio, is adding 15,000 sq. ft. of floor space to its manufacturing plant. Provision is being made for designing and engineering departments and a testing laboratory.

Fox Paper Co.,
Cincinnati, which last summer established a plant in High Point, N. C., for the manufacture of blankets, pads and wrappings for the furniture industry, is planning to double its facilities there. C. R. Walker, president, announced that $250,000 will be invested in the project.

Container Corp. of America
has announced plans to open a new folding carton plant at Oaks, Pa. The operation was to get underway about the first of May. The building is of one-story brick and steel construction with 150,000 sq. ft. of manufacturing space. It is located on a 22-acre site about 20 miles west of the firm's Philadelphia mill. Machinery and equipment includes new offset printing presses and several units transferred from the Philadelphia carton plant.

Portugal Mill First in P&W Point Four Plan

A contract covering the building of a complete pulp and paper mill project in Portugal has been signed by Lyddon & Co. of London for the Parsons & Whittemore-Lyddon organization. The announcement was made by Karl F. Landegger, president of Parsons & Whittemore Inc. of New York, N.Y. This is the first European development in the "Private Point Four" plan announced recently by P&W in which complete pulp and paper mill projects —based on raw materials found in various areas of the world—will be engineered, developed and built.

The mill will be constructed for Celluloses do Guardiana, S. A., of Lisbon, and work is to be started within the next several months. The contract provides for a plant producing a daily 25 tons. It includes a power and steam plant, as well as a paper and board converting factory. The mill is expected to be in operation within two years.

The raw material to be used will be wheat or other cereal straw available in Portugal, together with small quantities of waste paper and imported pulp. This is in accordance with Parsons & Whittemore's policy of developing projects based on the pulping of short-fibered material found in the various countries where wood pulp is not available.

Equipment for the Portuguese mill will be provided by the paper machinery companies affiliated with the Parsons & Whittemore-Lyddon organization—The Black-Clawson Co. of Hamilton, Ohio, and Millspaugh Ltd. of Sheffield, England.

New Marks Seen in U. S. Pulp Industry

Another high level year for the nation's wood pulp industry has been forecast by L. Turcotte, president of Puget Sound Pulp & Timber Co. Basing his prediction on first-quarter output and consumption figures, Mr. Turcotte declared that, "more wood pulp was produced and used in the United States during the first three months of 1953 than in the corresponding period of 1952 or any previous year—including 1951, the year in which the industry established its best record to date."

He cited figures showing that U. S. mills produced 4,339,000 tons of all grades of wood pulp in the first quarter of this year, as against 4,274,000 in the like period of 1952. Imports for the quarter rose to 527,000 tons from the 493,000 of last year's first quarter, while exports fell to 30,000 tons from 60,000 tons.

Domestic production, plus the import balance, gave American consumers 4,836,000 tons of new pulp supply in the first quarter, as compared to last year's figure of 4,697,000. A rise in imports from Scandinavia was noted this year, partly offsetting the reduced shipments from Canada.

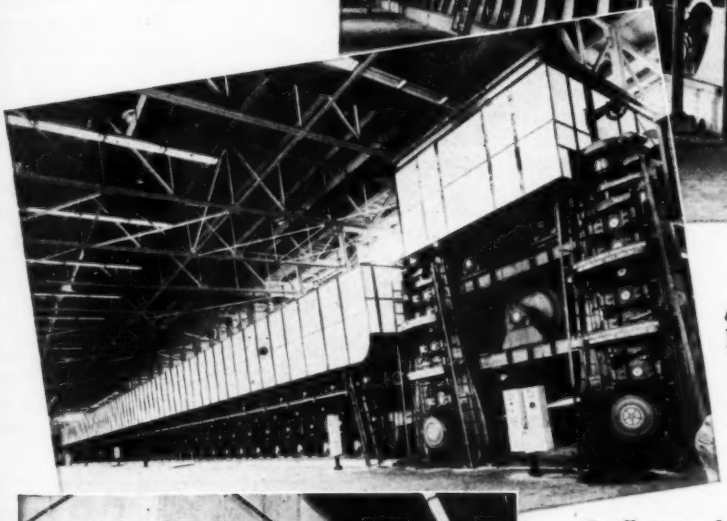
Northwest Lumber and Plywood Plants "In the Chips"

Resulting from an ever-increasing trend toward complete utilization, many Pacific Northwest lumber and plywood plants are "in the chips" in two ways. In 1941 it was estimated that 49 per cent of each Douglas fir log was wasted; today almost everything is used.

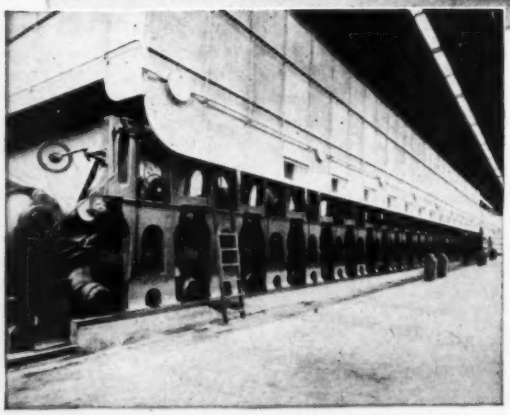
At least 100 sawmills and plywood plants have now installed chippers. Their output is estimated at "one trainload" daily. The chip-buying pulp mills produce about 2,740 tons of kraft paper every 24 hours, and now half the raw

Modernize with a new Puseyjones Dry Part

Dryer Part for high speed felt machine arranged in four drive sections.



Dryer section for kraft fourdrinier liner board machine with high pressure dryers. Note also arrangement of large dryers between the calender stacks.



Footboards are out in this modern dryer section. Ladders on tracks run the entire length of the dryers.

Inefficient dryers are slowing production, increasing maintenance costs in many mills. Sometimes the replacement of outmoded low pressure dryers is the answer. In several unique modernizations, the machines continued to turn out paper by isolating each of the dryer sections in turn while the maintenance and operating crews made the change-over.

Puseyjones engineers will be glad to show you the latest developments in efficient, high-speed dryer sections. They have facts and figures to prove that modernization pays – in stepped up production, better sheet quality and a wider range of paper products. Write us today.

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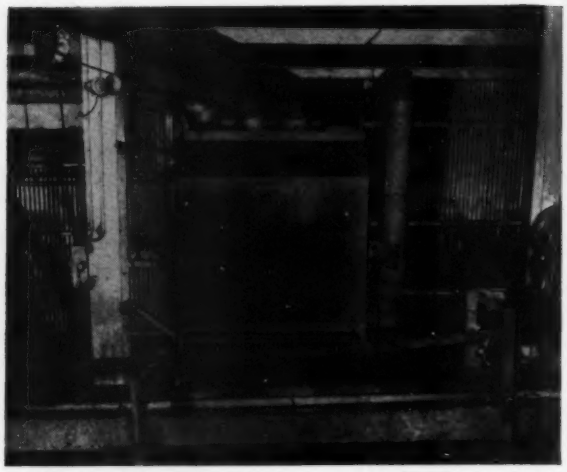
THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-Making Machinery

Fabricators and Welders of all classes of Steel and Alloy Products

Wilmington 99, Delaware, U.S.A.

INCOMING logs enter the debarking house on the inclined conveyor; heater is installed in the foremost corner of the building



HEATERS by Dravo are installed in out-of-the-way places, and the heated air is forced through the circular ducts to critical areas

S. D. Warren Solves Foggy Problem With Space Heaters

Heavy fog that was plaguing efficient operation at an unheated log debarking building during winter months has been dispelled at the Cumberland Mills of S. D. Warren Co. in Westbrook, Maine, through the installation of space heaters.

The warm spray used on incoming logs to remove ice and attached dirt and to wash away bark particles was forming a dense fog upon contact with the frigid atmosphere. The fog diffused throughout the building, and ventilating fans could not clear the air. Conditions were so bad that operators at conveyor controls could not see logs on the chain 4 ft. away.

The foggy atmosphere was not only an accident hazard; it made working conditions miserable. Other effects were that the moisture condensed on the machinery, causing it to freeze up, and collected on and in electrical equipment to damage the insulation and cause short circuits and burn-outs.

The most practical solution was to get heat into the building. Increasing the temperature of the atmosphere would enable it to evaporate more moisture and hold it invisible. However, under this condition the humidity would always be near the saturation point, with moisture condensing onto the equipment at the slightest drop in temperature.

To effect a cure of the moisture problem, Warren engineers installed oil-fired space heaters in each end of the structure. The units are Counterflo 1,250,000 Btu per hour heaters manufactured by Dravo Corp. Fresh air from the outside is forced through them by their individual blowers and distributed to critical areas through overhead ducts. This method not only heats the building, it forces the moisture laden excess air out open windows at the top of the structure. Damper arrangements provide maximum flexibility to recirculate inside air and to temper incoming air.

The building is of corrugated metal construction with 2-in. layers of cellular glass insulation applied to the metal roof. With a floor area of 5,500 sq. ft. and an average ceiling height of 30 ft., the structure's estimated heat loss is 2,100,000 Btu per hour. According to Warren spokesmen, the heat source, designed on the basis of 55°F. inside and minus 10°F. outside, has been entirely adequate to maintain an inside temperature of 70°F.

---

material comes from chips. It has been forecast that within two years the chips that were once waste may account for 70 per cent of the raw material used by West Coast pulp mills.

The savings resulting from the use of chips for pulp production is shown by the recent statement of an official of one of the big Oregon plywood plants: "Up to about a year ago we used our green veneer trimmings and other leftovers in a steam boiler to generate electricity. Then we found that it was costing as much to make electricity as it would to buy it. Now, we grind the waste into chips and sell them to a pulp mill. It means about $100,000 a year extra revenue for us."

Tree saving

Foresters claim that this booming chip business is saving mature trees that otherwise would be pulped for paper. They estimate that it means saving 8,000 acres of old-growth annually.

Crown-Zellerbach Corp., the West's big papermaker, uses many wood chips. At Camas, Wash., where the firm has the world's largest specialty paper mill producing an annual 250,000 tons, 25 per cent of the raw material used is chips.

"That's about equivalent to 5,000,000 board feet of timber per month," reveals Frank Drumb, Camas resident manager. "This chipping business is a tremendous contribution to forestry."

Sweden's Largest Machine Completes Billerud Expansion

Costing some $7,000,000, the large expansion and modernization program of Billeruds Co. at its Gruvon, Sweden, mill has been completed with the installation of a giant kraft paper machine.

Claimed to be the largest ever installed in Sweden and one of the biggest in Europe, the new machine has a production capacity of 30,000 tons per year. It will increase the total annual output of the mill to 65,000 tons, thus making Billeruds the largest manufacturer of kraft paper in Sweden.

Built by the Karlstad Works, the new unit is intended chiefly for the manufacture of unglazed kraft sackpaper. Production will be of qualities that will vary in weight from 40 to 400 gm. per sq. meter. With a length of 330 ft. and an untrimmed width of 17 ft. 3 in., the machine has 11 sections, each of which is driven by a dc motor. The latter, together with all other electrical equipment, was supplied by ASEA. The speed of the motors can be regulated jointly or separately. Wire speed can be varied from 230 to 1,150 fpm, though the design makes possible an increase up to 1,475 fpm. Automatic regulators keep speed and tension constant within a limit of plus or minus 5 per cent independent of any change or variation in the electric system. Modern dryers consist of

Fig. 2491.—Stainless Steel O. S. & Y. Gate Valve for 150 pounds W. P. Available in a variety of other corrosion-resisting metals and alloys. Also made with screwed ends.

If you want freedom from worry, install POWELL VALVES

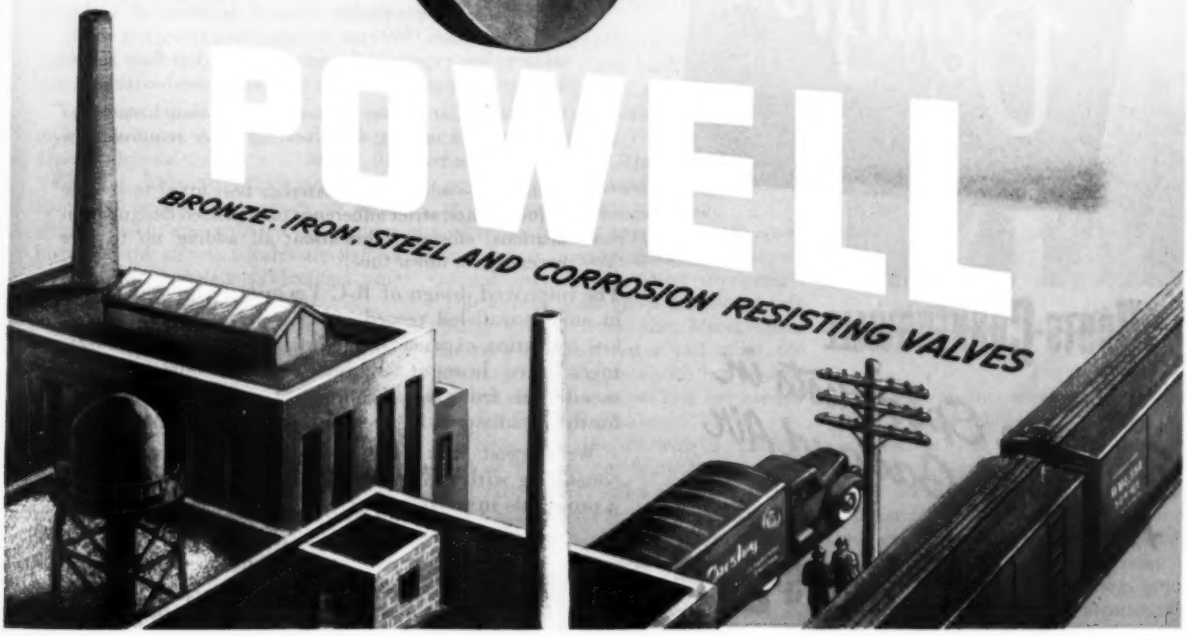
Altho not one of the "Four Freedoms", freedom from worry is greatly to be desired. And in flow control equipment you can have this freedom by installing Powell Valves — the valves with a record for long, dependable performance with minimum maintenance.

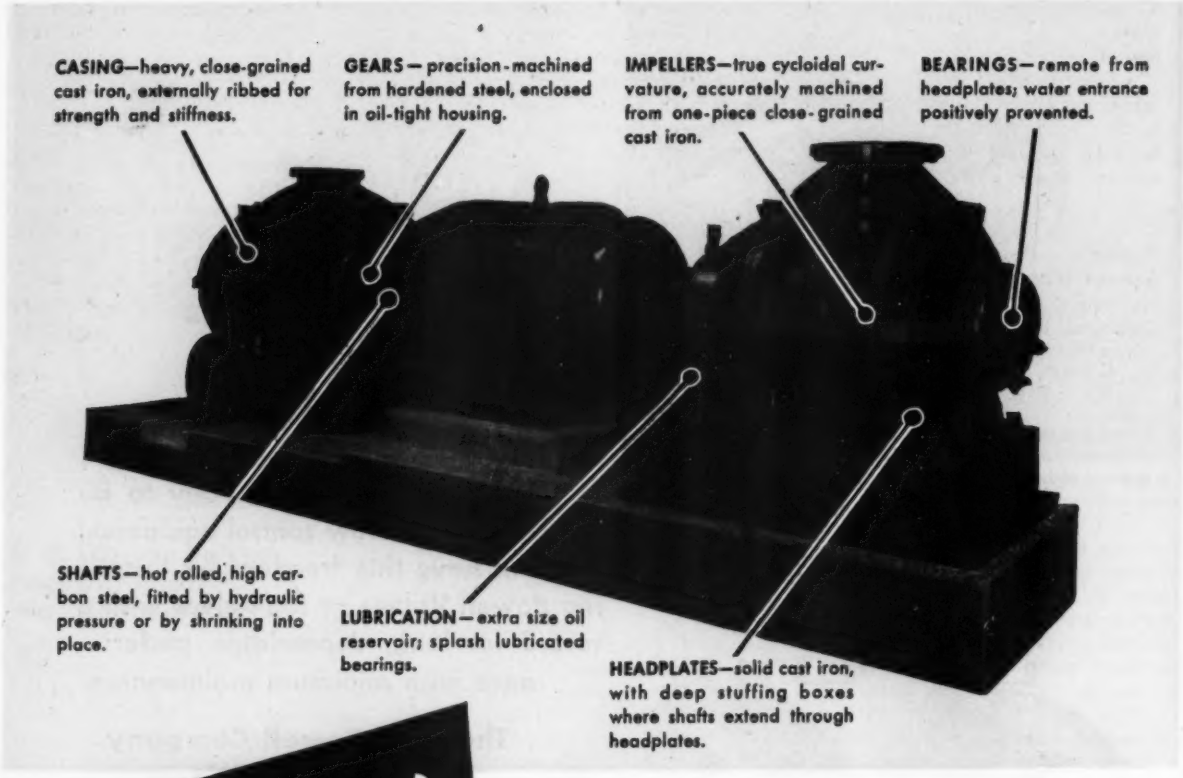
The Wm. Powell Company
Cincinnati 22, Ohio

DEPENDABLE VALVES SINCE 1846

POWELL

BRONZE, IRON, STEEL AND CORROSION RESISTING VALVES




CASING—heavy, close-grained cast iron, externally ribbed for strength and stiffness.
GEARS—precision-machined from hardened steel, enclosed in oil-tight housing.
IMPELLERS—true cycloidal curvature, accurately machined from one-piece close-grained cast iron.
BEARINGS—remote from headplates; water entrance positively prevented.
SHAFTS—hot rolled, high carbon steel, fitted by hydraulic pressure or by shrinking into place.
LUBRICATION—extra size oil reservoir; splash lubricated bearings.
HEADPLATES—solid cast iron, with deep stuffing boxes where shafts extend through headplates.

Improved Design...

BRINGS EXTRA VALUES FROM R-C VACUUM PUMPS

The specifications shown above of modern R-C Vacuum Pumps in either single stage or compound units result in these advantages:

1. *First Cost*—substantially reduced because of higher speed operation (600 rpm or more), requiring less costly motors, less expensive foundations and less floor space, because of large capacity in one pump combination.
2. *Operating Cost*—lower power consumption because of smaller sized motors; little sealing water required; low maintenance cost.
3. *Reliability*—selection of materials best fitted to specific requirements; strict adherence to improved design specifications; efficient lubrication; all adding up to rare necessity for down time.

The improved design of R-C Vacuum Pumps has resulted in an unparalleled record of reliability, low first cost and low operating expense. Together, these three basic advantages have brought frequent and enthusiastic recommendations from users to prospective users. They account for the rapidly growing list of unqualifiedly satisfied owners.

We suggest that time spent visiting these users, and consulting with R-C Vacuum Pump specialists, will prove a profitable investment.

ROOTS-CONNERSVILLE

Exclusive Specialists in Handling Gas and Air

ROOTS-CONNERSVILLE BLOWER A DIVISION OF DRESSER INDUSTRIES, INC.
536 Monroe Ave. • Connersville, Ind.

40 cylinders and 10 felt dryers. All operations are controlled by push buttons on a central panel.

A heat regenerator supplied by Svenska Flaktfabriken recovers an amount of heat from the moisture evaporated from the machine corresponding to 1,500 tons of coal per year.

Columbia River Mill to Diffuse Waste into Deep Water

Columbia River Paper Mills of Vancouver, Wash., has announced plans to install a deep-water distributing line to diffuse spent sulfite liquor into the Columbia River. The installation was approved in order to help relieve the problem of slime growth in the river, which has drawn recent complaints from fishing interests.

About 1,300 ft. of 8-in. stainless steel pipe and 400 ft. of special 6-in. rubber pipe will be laid into the river. The effluent is now discharged from the plant at the bank of the stream. Three similar installations are now in use on the Columbia, while two are in operation in the Puget Sound area.

Diatom Traps Used to Test Stream Conditions

Diatom traps floating in Beaver Creek above Downingtown, Pa., are part of long-range plans to find out more about stream life and pollution and to improve fishing conditions. They are being used to test the effectiveness of Eagle Paper Mill's recently installed waste treatment plant.

The peculiar-looking bobbing objects, anchored with white nylon cord, were placed in the stream by Drs. Matthew Houn and Charles Reimer of the Philadelphia Academy of Natural Sciences in connection with a biological survey initiated by the Brandywine Valley Association.

The traps, made of clear plastic with metal floats, are designed to float with glass slides submerged just below the water line. Diatoms, which are microscopic one-celled plants, grow in these slides, which are replaced at regular intervals; the removed slides are flamed and the hard skeletons identified and counted.

Research has shown that when a stream is healthy there are many types of plant and animal life present. Another indication of health is the presence of moderate numbers of each kind of organism, rather than many of one kind and few of another.

This balance of aquatic life is essential to the development of higher forms of stream life and indicates a properly functioning food chain. If the water is polluted by toxic wastes, there will be maladjustments in the balance, and the food chain will be broken. Each organism feeds on the smaller, more numerous ones preceding it, and if the chain is interrupted dependent animals such as fish are deprived of their food.

Because diatoms are abundant and good indications of the functioning of the food chain, experiments like these will yield much information as to what is needed to clean up streams and restore the balance essential for natural life.

Green Bay Paper Puts Squeeze on Pollution

Experiments with a new method of abating stream pollution by waste sulfite liquor are being conducted at the plant of Green Bay Paper & Pulp Co., according to an announcement by George Kress, president.

Equipment installed April 16 and in continuous operation since that time—except for machine design modifications—is an adaptation of the screw-type presses used in the oil extraction industry. Basically, the process directs chemically cooked wood chips into presses and squeezes concentrated liquors from them.

This is effected by a screw shaft rotating in a 7-in. diameter cage that produces approximately seven tons psi pressure on the chips. The pressing, done before the chips are further diluted, makes it possible to work with as little as 35,000 gal. of concentrated waste, rather than the present 700,000 gal. of diluted waste, every 24 hours. The 35,000 gal. figure, however, has been set as a goal at the Green Bay plant. The present capacity of the experimental unit is not sufficient to produce such a reduction, Mr. Kress stated.

40-ton capacity

The experimental presses (Pressifiners) are now operating on half of the semichemical mill's production lines and are being used primarily to gain operational data, such as waste liquor extraction efficiency, quality characteristics of the pulp produced, production figures, and corrosion effect. The capacity of the experimental equipment is 40 tons of cooked chips, compared to a normal daily processing of 60 tons. The daily tonnage average of the entire mill is 120 tons under normal operations.

Company technicians are making tests to determine whether the pressed liquor, with further concentration, can be used by kraft type mills as an added liquor for their chemical recovery systems.

"The present effluent going into the Fox River is only about one-fifth as detrimental (per ton of paper produced) to natural river or stream conditions as a full chemical sulfite liquor," according to George E. Mackin, general manager. "This is due to the small amount of woods dissolved by the semichemical cooking process . . . Our type of 'pollution' is actually non-bacterial and merely diminishes the oxygen content of the stream as contrasted to the effect of raw sewage. If we can effect the reduction for which we hope, our discharge of polluting effluent will be negligible."

Modern Tugs and Brave Men Operate Abitibi's 185-Mile Lifeline

NEARLY 200 MILES of treacherous Lake Superior water face the tug crews that bring pulpwood from Heron Bay, Ont., on the northeast tip of the lake to Abitibi Power & Paper Co.'s mill at Sault Ste. Marie. The courage of the men and modern equipment make it a smooth and efficient operation.

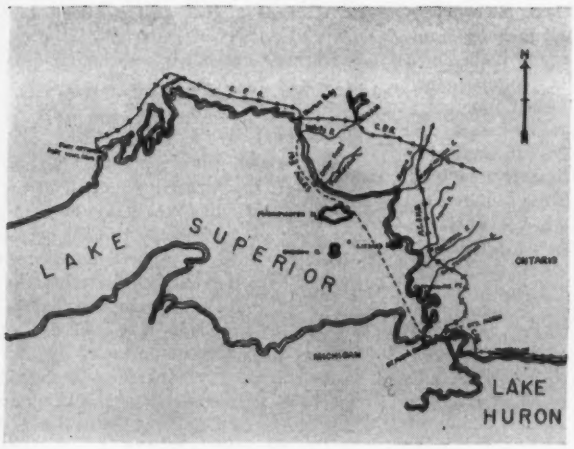
Ever-increasing quantities of wood and longer towing distances have required bigger and better equipment. Thirty-three years ago a 6,000-cord raft being towed from the Michipicoten River was considered a tall order for the major tug *Reliance* with her towline pull of 6½ tons; sometimes she needed the aid of the *Puckasaw*.

Today, the *Abitibi* with a towline pull of 17 tons can bring 12,000 cords in a raft the 185 miles from the White River near Heron Bay to the Soo. Logs from a 12,000-cord raft laid side by side would build a corduroy road 8 ft. wide and 60 miles long. A normal season's towing of say 10 rafts spread in the above manner would reach from the Soo to Montreal.

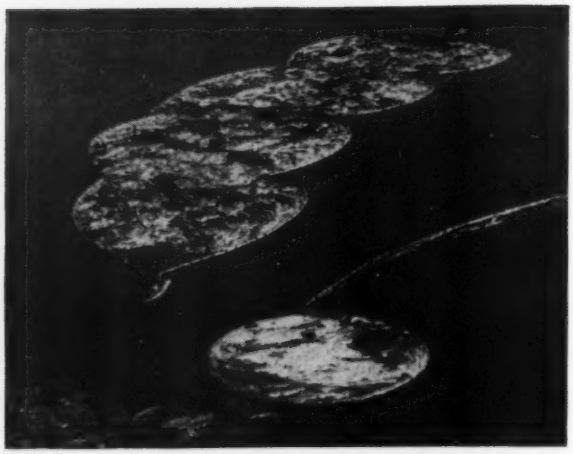
Capt. J. W. Alexander
Marine Supt.

Joe Houle
Booming Ground Foreman

Heading this water-borne operation is Marine Supt. Capt. J. W. Alexander, who joined the firm in 1919. Capt. Alexander gives complete credit for the success of the treacherous voyages down the lake to the rafting out crews, the tug crews, and the booming ground crew. All these men—the foremen, rafts-



COURSE of the Abitibi tugs as they bring pulpwood from Heron Bay to Sault Ste. Marie



BANDED RAFT containing 11,000 cords; tug *Abitibi* is in front, *Magpie* at the rear

men, tug captains, mates, engineers, wheelsmen, oilers, deckhands, cooks, blacksmiths, and laborers—come under the guiding hand of the popular captain.

Better conditions on board

In the early days the tugs also handled the freighting of men and supplies from the Soo to the woods operations. This job is now done largely by the railways, and progress has scrapped the wooden tugs *Emerson, Commodore, Reliance, Puckasaw, Gray,* and *Gargantua.* They have been replaced by modern high-powered steel tugs that bear the names *Abitibi, Kam,* and *Magpie.*

Improved living conditions and higher caliber personnel have sparked progress in the last 33 years, brought about stiffer regulations, inspection, and the demand for more highly trained men to perform ever-increasing and more specialized jobs.

In the early days food was stored in vegetable crates on top of the deckhouse. Today, supplies are kept in modern electric refrigerators; cabins have been refitted and air conditioned, and navigating and handling devices are being steadily improved to meet the demand for more efficient handling. The diesel engine, radar, radio-telephone communications and power winching devices are all part of today's equipment just as the steel cable has replaced the manila tow rope.

Hazards of the sea

Not all is clear sailing for the men who operate and live on the tugs. "Tows have been lost or gone adrift through boom breaks or grounding, and storage booms have let go," Captain Alexander declares. "But in each case the wood was salvaged and in time found its way to the mill."

He recalls two memorable events in the Soo towing history—the grounding of the tug *Reliance* in December 1921 and the *Gray* incident of 1936.

The *Reliance* was en route from the Puckasaw to the Soo with a group of men in addition to the crew and various stores when she met a headwind and blinding snow storm. The boat ran aground on the north shore of Lizzard Island in Lake Superior. Four men lost their lives. Those that reached shore summoned aid, and the *Gray* finally was able to rescue the remaining survivors who were marooned on the island. In May 1922 the *Reliance* was salvaged and taken to dry dock. The port side of her hull was flattened and had to be completely renewed. One year later she was refloated fully repaired and ready for service.

In 1936 during a nor'wester the tugs *Gray* and *Gargantua* were towing a raft to the Soo and had just rounded Coppermine Point. Both tugs were taking the sea on the after-quarter and rolling their decks. Shortly after dark the *Gray* rolled her funnel overboard, taking the whistle and some steam pipes. The pipes, broken by the falling funnel, put the steering gear out of commission and rendered the tug helpless. The *Gray* sheared toward the *Gargantua* and cut her towline. The latter tug finally got the *Gray* in tow and took her to Batchewana, leaving the raft adrift. The raft was later salvaged in good shape and 15 miles nearer the Soo.

Northwestern Pulp to be Sold to Oil Interests

Subject to shareholders' approval, North Canadian Oils Ltd. plans to acquire substantial new assets in Alberta through the purchase of all the outstanding stock of Northwestern Pulp & Power Ltd. and Bryan Mountain Coal Co.

Northwestern Pulp owns a timber reservation covering approximately 1,280,000 acres about 120 miles west of Edmonton, while Bryan operates a coal mine at Robb. The mine is presently equipped to produce 1,000 tons daily.

North Canadian is reported to be planning the development of a pulp and paper operation that would produce an estimated 300 tons of kraft daily. A preliminary survey has indicated a source of supply that would provide 25,000,000 cords of pulpwood.

Prince Rupert Ships First Pulp Cargo

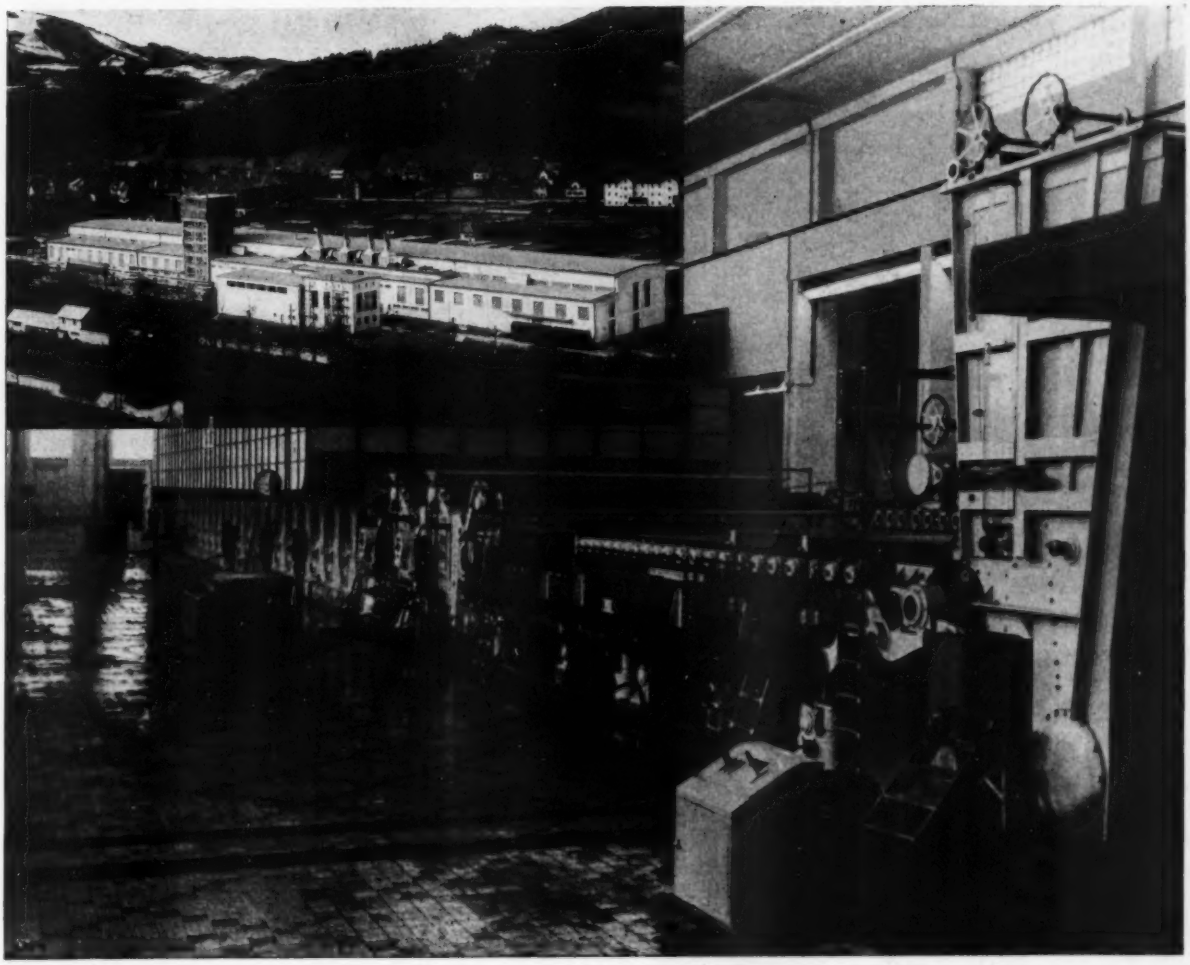
Deepseas shipping from Prince Rupert, B. C., got another boost early in April when 500 tons of pulp were loaded for France. The first water shipment of Columbia Cellulose Co. Ltd.'s pulp production was announced by W. C. R. Jones, mill manager. Previous shipments had been by rail.

The high alpha product will go into the manufacture of celanese acetate silk. The ship loading the cargo was the *S. S. Mongolia,* operated by East Asiatic Co. Ltd.

Dwindling Ontario Pulp Stands Spur Joint Project

"The broadest cooperative effort ever undertaken in Canada to conserve and increase the productivity of the forests" is the manner in which Premier Leslie Frost of Ontario has described a research program designed to combat the problem of dwindling pulpwood stands in the province.

A crew of experts drawn from government, industry and science is attacking the problem in the timberlands north of Lake Superior. Initial expenditures for the five-year research program are expected to approximate $20,000. The immediate job ahead is to increase the growth of pulpwood spruce near the Lakehead, where the ratio of growth to



This is the most recent of Bagley & Sewall productions, designed, built and installed for the Murztaler Holzstoff-und-Papier-Fabriks A.G. in the city of Bruck/Mur, Austria, one of Europe's finest and most modern paper mills.

This fourdrinier machine has a wire width of 226 inches and length of 100 feet. Outstanding in design features, from the remote control system to the many engineering innovations throughout the various machine sections, it is one of the most modern papermaking machines in the world, today. Another B & S paper machine designed for efficient and economical manufacture of paper.

International recognition and acceptance of Bagley & Sewall resourceful engineering and precision built papermaking machinery is evidenced by the many installations in leading mills throughout the world.

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You can get more paper from this tree . . .

Armour glue and the Sveen system assure maximum retention of fine fibers, fillers and pigments

The Sveen process uses chemically modified glue solutions added to the stock to increase retention of fine fibers and fillers. Another advantage is a possible 50% reduction in the remaining solids in the white water, so this system reduces the separation required of mechanical save-alls or sedimentation-type recovery systems. For these reasons, and the economies they represent, the Sveen system is becoming increasingly popular.

Armour offers two outstanding glues for this application. BC high jelly strength Special Hide Glue is an accepted standard for the process. And Armour CX Special Bone Glue is a medium jelly strength dry glue, lower in price. Both are outstanding colloidal flocculents, and the choice between them should depend on local conditions. Our Technical Sales Service Department will gladly work with you to determine the most efficient, economical glue for your operation.

These are only two of Armour's adhesives for the paper industry. Our clear chrome hide glue is extensively used for surface or tub sizing of rag bond paper. We have other glues for "on machine" creping directly from the Yankee Dryer that supply the tacking properties necessary for softness in paper tissues. Write Armour today for complete information, including prices, on this line of glues for paper making.

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cutting has been inadequate. Weeds and brush have smothered spruce seedlings that spring up after logging operations.

Taking part in the program in addition to the federal and provincial governments are Abitibi Power & Paper Co. Ltd., Ontario Paper Co. Ltd., the Research Council of Ontario, the University of Toronto, and the Pulp and Paper Research Institute of Canada. Field work is being conducted on the cutting limits of Ontario Paper near Heron Bay.

Favorable Report Issued on Newsprint from Sawgrass

Dr. Reavis C. Sproull, executive director of the Herty Foundation Laboratory in Savannah, Ga., has reported that experimental work done on sawgrass has "resulted in the development of a newsprint replacement equal to and superior to papers made for the same purpose from other raw materials."

Dr. Sproull described a test printing on the Tallahassee (Fla.) *Democrat* as being quite satisfactory. (See *The* PAPER INDUSTRY for May, page 201.) He added that experimental work indicates that sawgrass papers of all grades can be economically manufactured, and that sawgrass should lead "to the alleviation of the shortage of newsprint type papers at an ultimate substantial reduction in cost."

Sawgrass appears as a natural growth on about 2,000,000 acres of the Florida Everglades. The experimental program was planned in conjunction with Joseph Glenn Weimer & Associates and carried out by personnel of the Herty lab.

Meanwhile it was announced that exclusive sawgrass cutting rights in the state-owned Everglades had been granted to Weimer & Sackett of Tallahassee. This firm plans to build a pulp mill in the Belle Glade area for production of newsprint by the celsedge process.

Precarious Balance Continues

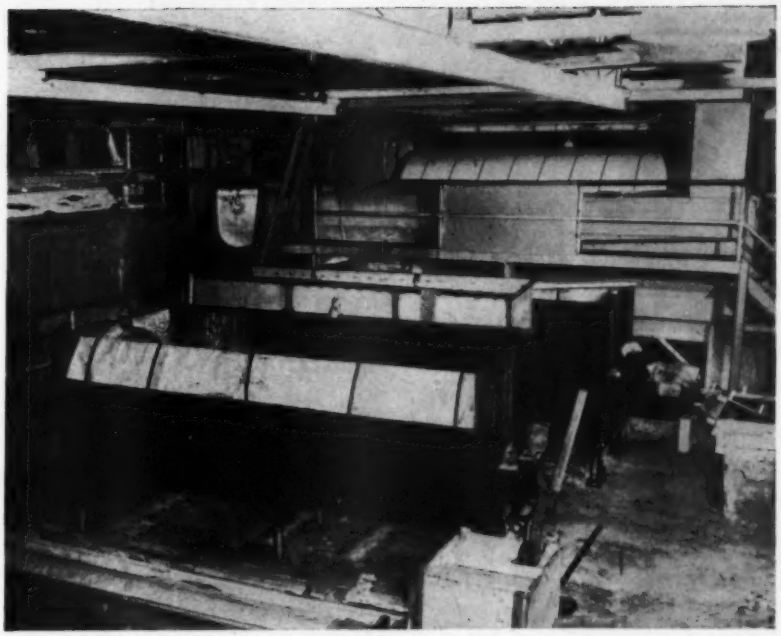
"The precarious balance between newsprint production and the growing demand will continue indefinitely," the National Production Authority has told newsprint consumers. The agency reported that output of United States and Canadian mills in the first three months of 1953 was 1,665,670 tons, almost equal to the peak rated capacity of 1,698,936 tons. U. S. consumption of newsprint now exceeds 6,000,000 tons per year.

Newsprint Price Boosts

Powell River Co. Ltd., largest newsprint producer in British Columbia, recently informed its Canadian customers of a $7 per ton increase in price. The firm pointed out that its price for Canadian consumption was not raised when the North American rate was increased in October of last year—primarily because of the federal sales tax then in effect.

Effective April 1, newsprint mills in Canada's Maritime Provinces increased their price to Canadian consumers by $10 per ton. New Brunswick mills now sell for $123 per ton; the mill at Grand Falls, Nflnd., $122; Mersey Paper Co. Ltd., $124. Bowater's Newfoundland Pulp & Paper Mills Ltd. at Corner Brook is maintaining its price of $119.20 established January 1.

Great Northern Paper Co. has boosted its price of standard-size newsprint by $2 per ton effective July 1. This action will leave Great Northern's price delivered in New York, N. Y., $1 under the $126 figure generally quoted by other firms. The company gave no explanation for its move.



TWO NEW COWAN groundwood deckers at the Thunder Bay, Ont., division of Abitibi Power & Paper Co. Ltd. just prior to completion of installation; the units, manufactured by Appleton Machine Company, have cylinder molds 48 in. in diameter with a 131-in. face, constructed of bronze and having stainless steel backing and facing wire; the decker does not employ a vacuum and operates by stock pick-up and gravity white water drainage; it is capable of thickening 35 tons of air dry stock per 24 hours

April Newsprint Statistics

Production of newsprint in Canada (including Newfoundland) during April amounted to 480,316 tons and shipments to 498,889 tons. Output in the United States was 88,194 tons, and shipments were 89,004 tons, making a total North American production of 568,510 tons and shipments of 587,893 tons. This compares with continental production of 566,002 tons and shipments of 562,268 tons in April 1952. According to the Newsprint Service Bureau, North American production in April was greater than in any April on record.

The Canadian mills produced 1,381 tons more in the first four months of 1953 than in the corresponding period of 1952, an increase of 0.1 per cent. The output in the U. S. was 29,589 tons, or 7.7 per cent, below that of the first four months of last year; thus the net continental decrease from the January-April production of 1952 amounted to 28,208 tons, or 1.2 per cent.

Stocks of newsprint at the end of April at Canadian mills totaled 183,273 tons, at U. S. mills 7,887 tons, making a total of 191,160 tons. This compares to 210,543 tons on March 31, 1953, and 179,156 tons at the end of April 1952.

Herty to Study Properties of Bamboo

Dr. Reavis C. Sproull, director of the Herty Foundation Laboratory in Savannah, Ga., has announced that the laboratory is undertaking a project in behalf of the Division of Plant Exploration of the U.S. Department of Agriculture to study the properties of bamboo as related to pulp and papermaking. Twenty species of potential pulp-yielding bamboos that may be grown in the southern part of the United States will be examined for fiber size, chemical composition, and suitability for pulp manufacturing.

USDA officials explained that this is part of a larger program to develop

BUSINESS MEETS WITH GOVERNMENT at the Ninth White House Conference of The Advertising Council; above, Reuben B. Robertson (right), chairman of the board of The Champion Paper & Fibre Co., chats with Chester C. Davis (left) of the Ford Foundation and Fred F. Florence of the Republic National Bank of Dallas

new plant species that can be grown economically in this country. The work falls within the scope of the Research and Marketing Act of 1946, which was passed to encourage the discovery, introduction and breeding of new and useful agricultural plants that may be adapted to utilization in chemical and manufacturing industries.

In making the announcement, Dr. Sproull declared that early in the life of the Herty Laboratory work was carried out in conjunction with the Bamboo Farm (Barbour Lathrop Plant Introduction Garden) located near Savannah. Bamboo for the current experimental work will come from the farm, of which D. E. Bisset is the agricultural aide in charge.

International Sells Georgia Properties

International Paper Co. has announced that it has sold a part of its Richmond Hill, Ga., property to a new Georgia corporation, Richmond Hill Enterprises Inc., of which Gilbert Verney is president.

The property sold includes the buildings and land comprising Richmond Hill and Blueberry villages. The Hermitage mansion, for many years the winter home of the late Henry Ford, and other outlying properties are also included in the transaction.

Other property acquired from the Ford Foundation in 1951 by International, including 50,000 acres of timberlands, is being retained by the company. The timberlands will continue to be operated under a long-range forest management program.

Record Attendance Expected at 1954 German Fair

The 1954 International Printing and Paper Fair—DRUPA—will be held in Dusseldorf, Germany, May 15-30. A record-breaking attendance is expected at the exposition.

The fair is to be conducted by the following organizations: the Trade Association Printing and Paper Machinery of the Association of German Mechanical Engineering Works; the Working Association Graphic Societies; the APV Working Association Paper and Cardboard Converting Industry; the Federal Association of Paper Wholesalers; the Trustee Office for the Cellulose and Paper Industry; the Association of the Mineral Colours Industry (Printing Ink Section), and the Association of German Commercial Artists.

Marathon Corp.'s new $1,000,000 freighter, the *D. C. Everest*, has completed her maiden voyage to Menominee, Mich. She was stuck for 20 hours in an ice jam at Sault Ste. Marie. The ship carried a 2,200-ton cargo of wood pulp from Marathon's plant at Marathon, Ont.

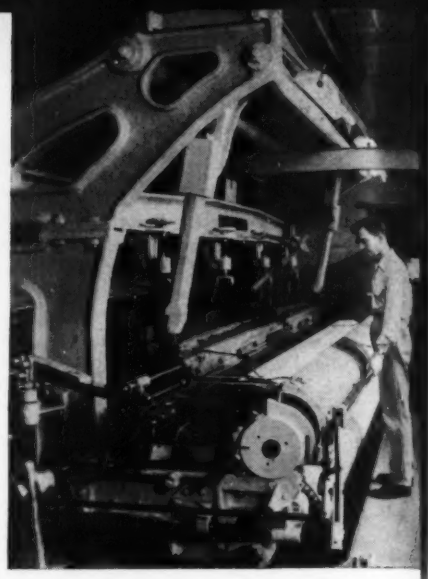
Experimental Calender Given Western Michigan

An experimental calendering machine has been presented to the paper technology laboratories of Western Michigan College, Kalamazoo, by Ward Wheeler of Wheeler Roll Co.

Although it is a small scale model, with some special features, it will operate at commercial pressures with rolls approaching commercial diameters. The unit is located in a constant humidity room, giving opportunity for special experimentation. The paper roll on the machine has a 15-in. face and is removed endwise through the frame of the calender. This alteration was necessary bcause of the lack of overhead space for maneuvering equipment.

Despite the small face of the calender roll for this model, it is not the smallest manufactured by Wheeler, which reports it is now making rolls as small as 4½ in. The largest made thus far is a 278-in. unit.

INSPECTING first sheet from new calender at WMC is Ward Wheeler of Wheeler Roll Co. (left) and Robert Elias of the school's paper technology curriculum



WIRE LOOM in operation at Wisconsin Wire Works; this and similar scenes are depicted in the firm's new movie

Wisconsin Wire Distributes Movie on Maufacturing Process

Wisconsin Wire Works of Appleton has produced a technicolor sound motion picture depicting the complete manufacturing process from raw copper to the finished fourdrinier wire.

The movie, "Weaving Wisconsin Wire," tells how virgin copper is transformed into one of the vital elements in the manufacture of paper. Announcement will be made when the picture is ready for distribution.

Raybestos-Manhattan Subsidiary Opens New Wisconsin Plant

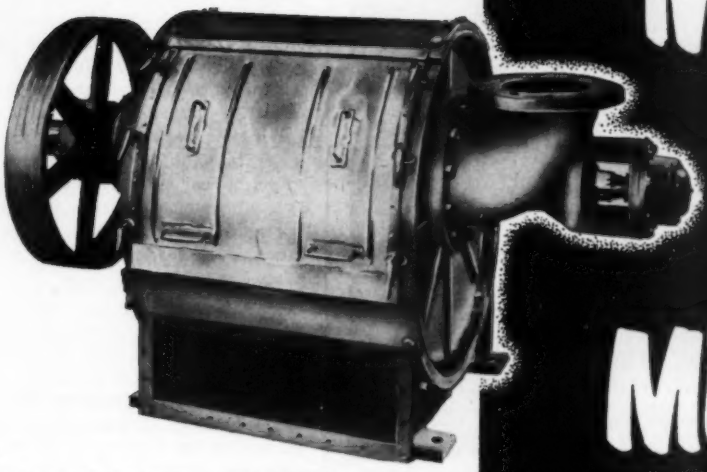
The opening of a new rubber roll covering plant at Neenah, Wis., for its subsidiary, The Manhattan Rubber Mfg. Co., has been announced by Raybestos-Manhattan Inc. The new plant expands existing facilities.

The single-story plant is built specifically for precision and efficient handling of roll coverings. It is planned for straight-line production, with a modern materials handling system and specially built machinery to handle the largest size rolls. Its location on a large tract of land permits expansion to meet all future needs.

Manhattan Rubber has been located in Neenah for 20 years, serving the paper industry in the Fox River Valley.

American Cyanamid Develops New Paper Sizing

Announcement of the development of a new sizing for the paper industry that makes it possible to manufacture new paper types has been released by American Cyanamid Co. Known as Cyron size, it eliminates corrosion of tin cans, steel instruments, etc., that are paper



The "Junior" Screen . . . smallest of *three* units producing from 35 to 150 tons per day, respectively.

Money Saving Midgets

Cowan Centrifugal Pulp Screens by

APPLETON MACHINE COMPANY

Added efficiency, greater economy are the watchwords for *Appleton Machine Company's* junior versions of the standard Mark "A" Cowan Centrifugal Pulp Screen, acknowledged as outstanding in its field.

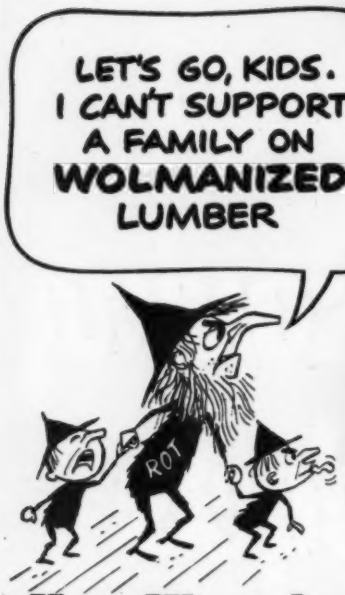
The Mark "E" Screen is a half-sized model of the standard Mark "A", conservatively rated at a capacity of 2400 U.S.G.P.M. accepted stock. 50 h.p. is required to operate the Mark "E", but its drive is designed to accommodate a 60 h.p. motor, wherever needed. The Mark "E" is particularly advantageous in smaller mills, or as a supplementary screening unit. Also, installing two Mark "E" Screens—instead of a single larger machine—provides a definite safety factor in case of breakdown.

The "Junior" Screen is a quarter-sized model of the big Mark "A", with a rated capacity of 1400 U.S.G.P.M. accepted stock. 25 h.p. operates the "Junior" Screen, but it will handle motors up to 40 h.p. Greatest applications are as secondary screening units, and as a primary screen for mills producing a variety of pulp grades which require a system made up of small, separate units.

Performance of these two Cowan Screens is comparable in every way to that of the standard Mark "A" Screen . . . the same high consistency screening . . . low percent rejects . . . good fiber separation . . . low shower dilution pressure . . . top hydraulic efficiency. Typically sound *Appleton Machine* construction plus a protective coating tailored to fit your needs *complete* your assurance of long-time satisfaction.

A APPLETON MACHINE COMPANY
APPLETON WISCONSIN

CUSTOM-BUILDERS OF PULP & PAPER MILL MACHINES
WINDERS • FINISHING ROLLS • REWINDERS



This Everett, Wash. tank of Wolmanized lumber will last for years

Two views of a Longview installation made rot-resistant by Wolmanized lumber.

How Weyerhaeuser Timber Co. Uses Wolmanized Pressure-Treated Lumber

In its Longview and Everett, Washington plants, the Pulp Division of Weyerhaeuser Timber Company is experiencing the value of Wolmanized pressure-treated lumber.

Pulp production's just about the "wettest" wet process there is. One that would cause ordinary lumber to soften in a matter of months. Over sixteen years ago Weyerhaeuser used Wolmanized pressure-treated lumber in their Longview plant for the first time. In spite of decay-producing moisture, that first Wolmanized installation is still in good condition, still giving Weyerhaeuser service. And now the newest mill in the industry Everett, Washington, is being rot-protected by Wolmanized tanks, process equipment, and structural lumber.

Wolmanized lumber's resistance to rot is largely due to the fact that Wolman preservative solutions are *forced* deep into the fibers of the wood by high pressures . . . not just brushed on or soaked in. And Wolmanized pressure-treated lumber is odorless, non-oily, clean, and completely paintable.

Wolmanized pressure-treated lumber is distributed nationwide, since Wolman preservative treatment plants are located in all parts of the country. Learn how you can get lasting rot and termite protection for your wooden structures. For full information write:

American Lumber & Treating Company

General Offices: **1601 McCormick Building, Chicago 4, Illinois**

Offices: Little Rock, Arkansas • Portland, Oregon • Boston • Los Angeles San Francisco • Baltimore • New York • Jacksonville, Florida • Seattle

Wolmanized

PRESSURE TREATED **Lumber**

labeled or wrapped. The size also is reported to reduce curl, especially troublesome to makers of wall and printing papers.

According to company officials, papers made with the new product are more durable and applicable to a wider range of uses. They assert that it is also advantageous in the manufacture of paper cement bags. It has shown outstanding results in both alkaline and acid stocks and is effective as a beater additive when water, high ink, acid, or alkali resistance specifications must be met. The new size, with which no resin, wax or alum is required, may be applied to the surfaces of resin-sized papers for added effect.

Allied Notes

Central States Engineering Inc.
has announced that its offices are now located in the Conway Hotel Building, Appleton, Wis.

Improved Machinery Inc.
will be on vacation for the week of July 4 through 12.

Eastwood-Nealley Corp.
of Belleville, N. J., will close most manufacturing departments for vacations from July 25 through August 9. During this period there will be no regular shipments of wire or wire cloth; however, the office and sales and engineering departments will remain open.

Eastman Kodak Co.
is planning the production of polyethylene at a new plant in Longview, Texas. Eastman has signed an agreement with Imperial Chemical Industries Ltd. of Great Britain licensing the production of the plastic. Output will be about 20,000,000 pounds annually.

Raybestos-Manhattan Inc.
has moved into its new office and warehouse building at 6010 Northwest Highway, Chicago. The firm's offices were originally located at 445 Lake Shore Drive.

Allis-Chalmers Mfg. Co.
has announced the combination of the district and branch office territories of Denver, Salt Lake City, Phoenix, El Paso and Spokane into the Rocky Mountain Region, with headquarters in Denver. Richard D. Moody, since 1950 manager of the Los Angeles district office, has been made manager.

North American Philips Co. Inc.'s
Research and Control Instruments Division has appointed John Batchelor of X-Ray Equipment Co. of Salt Lake City as local representative.

$1,000,000 B-C Expansion

The Black-Clawson Co. of Hamilton, Ohio, has announced a $1,000,000 expansion of its Hamilton Division. According to C. R. Crawford, president, the enlargement will include the purchase of new machinery and tools.

H. G. Weber Co. Inc.

of Kiel, Wis., gratified at the initial reception given its sound film produced as a training aid for its high-speed paper bag machinery, has embarked on a full-scale program of circulating the movie. The film was first shown during the APPA and Tappi conventions in New York, N.Y. The 16 mm. Kodachrome film, which runs 67 minutes, will be circulated among various plants operating Weber equipment. The movie covers completely the functions, operations, and adjustments of Weber paper bag equipment and its special adjustments.

American Car & Foundry Co.

has appointed W. B. Parsons Co. of Boston as representative in the sale of ACF lubricated plug valves in the Boston area.

Hercules Powder Co.

will use a mobile "Lacquer Center" to bring attention of industry to new developments and improvements in lacquers. The exhibit is housed in a 35-foot trailer that will visit plants in the United States, Canada and Mexico.

Battelle Institute.

Columbus, Ohio, has established a new technological information service aimed at assisting industry in streamlining the costly and burdensome job of tapping existing published knowledge. The service will be tailored to meet individual needs. It will include the preparation of bibliographies, and coding and classification systems. Where required, the Institute will undertake development of information processing equipment.

Rohm & Haas Co.

has recently put into operation a new plant for the production of acrylic monomers, raw materials used in the manufacture of coating resins. The plant represents an $8,000,000 addition to the firm's petrochemical operations at Deer Park, Texas.

Timken Roller Bearing Co.

has announced a multi-million-dollar expansion program for its Bucyrus, Ohio, plant. Included in the project will be a new toolroom to house the maintenance, repair, electrical, sheet metal departments, and all stores. New machinery and production equipment for the manufacture of bearing parts should be in full operation by the end of 1954.

FIRST ENGLISH-BUILT Langston Rotary Cut-off is inspected by officials of Samuel M. Langston Co. of Camden, N. J., and of Masson Scott & Co. of London; the 85-in. single rotary knife unit was manufactured under an arrangement whereby Langston cut-offs are built in England by Masson & Scott to take care of a certain portion of Langston's foreign business; those shown are (l to r) J. E. Battersby, director of Masson Scott; David Braid, works manager of Masson Scott; C. D. Nitchie, Langston chief engineer; Hugh R. W. Marsh, Masson Scott director; Bryant W. Langston, president of Langston, and George E. Kampe, general manager of Sheridan Machinery Co. Ltd.

$2,000 Awarded to Sandy Hill Employee for Invention

The Sandy Hill Iron & Brass Works of Hudson Falls, N. Y., has awarded $2,000 in United States Savings Bonds to *JULIUS J. COLVIN* as initial payment on his suggestion for the improvement of Packer flat screens. Mr. Colvin, an employee of the firm, developed a design for the screens providing for the quick release or replacement of plates and eliminating entirely the multiple screws previously used as plate fasteners.

The mechanism, which is to be known as the Sandy Quickloc screen vat, is a quick locking arrangement that offers a simple method for securing the screen plates. In addition to the time-saving element of Mr. Colvin's invention, the new method assures increased plate life since there will no longer be any reason for practicing the custom of walking on the plates while releasing or tightening.

According to Sandy Hill's announcement, it is also quite likely that screen efficiency will be increased by the more frequent cleaning resulting from easier operation. The positive and equally distributed pressure on the plate bevels provided by the new mechanism tends to eliminate chafing wear.

Several of the units are already in mill operation and are proving satisfactory. An advertising and publicity campaign is to begin in the near future to acquaint the trade with the production and the quality of the new screen vat.

CELEBRATING his good fortune, Julius J. Colvin (left) holds his model of the device for screen plate hold-down, while Joseph Levesque, president of the Sandy Hill Club, holds the bonds presented to Mr. Colvin as initial payment.

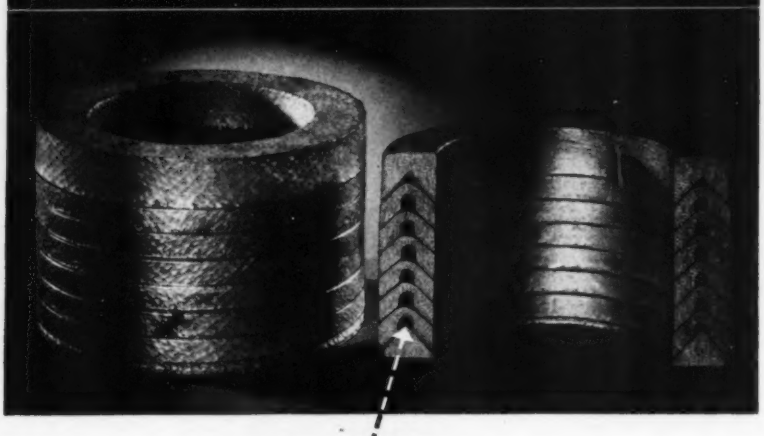
Fred Schwartz Joins Hudson-Sharp

FRED SCHWARTZ has joined the staff of Hudson-Sharp Machine Co., Green Bay, Wis. An engineer with experience in the paper machinery and allied fields covering 45 years, he previously headed his own firm of industrial designers. Mr. Schwartz was also associated with Combined Locks Paper Co. at Combined Locks.

A native of Menominee, Mich., Mr. Schwartz first entered the paper industry in 1912. From 1920 to 1925 he worked as machinist or toolmaker for various Wisconsin firms, later joining the experimental department of Fort Howard Paper Co. He was responsible for the design and development of Fort Howard's No. 4 paper machine.

Mr. Schwartz redesigned the Roberts wood grinder for Appleton Machine Co. in 1945 and a year later became a

CHEVRON* PACKING



Exclusive hinge-like construction assures a positive, low-friction seal

At every pressure—from the lowest to the highest—Garlock CHEVRON packing provides a positive, low-friction seal. CHEVRON is ideally suited for use on hydraulic cylinders (both single-acting and double-acting), hydraulic rams, plungers of pumps and other reciprocating rods.

The exclusive hinge at the apex of each ring makes this packing flexible and sensitive to pressure changes. When the pressure is on, CHEVRON packing seals firmly both on the inside and outside edges. When the pressure is off, CHEVRON packing maintains a positive seal yet allows the ram or rod to return without binding. This automatic action not only prolongs the life of the packing but also increases the efficiency of the equipment on which it operates.

That is why many manufacturers of hydraulic cylinders, jacks, lifts and presses use Garlock CHEVRON packing exclusively.

Whether your job is plant maintenance or manufacturing new equipment, ask us about CHEVRON packing—the exclusive product of Garlock's own factories. Garlock CHEVRON packing is available in many materials such as: cotton duck with rubber or neoprene binder, asbestos with rubber or neoprene binder, hycar, "Teflon," and "Kel-F."

THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK
In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

Branch Offices in Most Principal Cities

*Registered Trademark

GARLOCK

PACKINGS, GASKETS, OIL SEALS,
MECHANICAL SEALS, RUBBER EXPANSION JOINTS

partner in an Appleton engineering firm, doing consultant work for paper mills and machine product engineering.

Fred Schwartz

A. W. Plier

Plier Named President of D. J. Murray

A. W. PLIER, executive vice president, has been elected president of D. J. Murray Mfg. Co. of Wausau, Wis. He succeeds *FRED C. BOYCE* of Wauwatosa, who has been named chairman of the board. Mr. Boyce had been president since 1933.

Mr. Plier came to Wausau from Falls Mfg. Co. of Oconto Falls in 1930 to enter D. J. Murray's production department. In 1944 he was named secretary of the firm and elected a director in 1948. He was elected executive vice president and general manager in 1950.

"Archie" Zahn Marks 50th Year with Smidth

CAPT. A. B. ("Archie") ZAHN has completed 50 years of service with F. L. Smidth & Co. of New York, N. Y. He joined the firm in 1903, just eight years after its incorporation. After serving in various departments, Mr. Zahn was elected a director in 1917; in 1927 he was made assistant treasurer, becoming secretary in 1938. He is also a director and secretary of F. L. Smidth & Co. of Canada Ltd. An inventor, Mr. Zahn is known for the development of a special figure "8" chain used in rotary kilns for heat recuperation.

A. B. Zahn

H. F. Gardner

Allied Personalities

HERBERT F. GARDNER has joined Morningstar, Nicol Inc. of New York, N. Y., as a technical service and sales representative in the Paper Mill department. He formerly headed the paper

and adhesive laboratory in the Research Department of Pabst Brewing Co. Mr. Gardner's territory will include Minnesota, Wisconsin, Michigan, Illinois, Indiana, and northern Ohio. He will headquarter at the Morningstar Chicago office.

EDWIN A. PASHA has been named vice president of Merritt-Chapman & Scott Corp. in charge of the Industrial and Building Construction Division. His duties will include responsibility for current paper mill projects in Georgia, Florida, and Israel. Mr. Pasha has been associated with the firm since 1940.

JAMES E. DUFF is now eastern division sales manager for Cuno Engineering Corp. of Meriden, Conn. He was formerly advertising and sales promotion manager.

DONALD L. DeVRIES has been named manager of the precipitator department of the Metal Products Division of Koppers Co. Inc. Since 1950 he has been a sales engineer.

D. L. DeVries

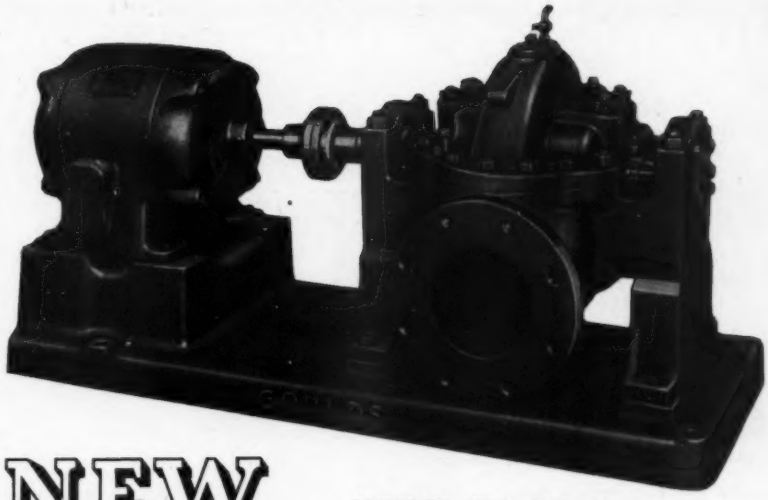
A. D. Bonanno

A. D. ("AL") BONANNO, former superintendent of the Coating Division of Champion-International Paper Co. at Lawrence, Mass., recently joined the paper technical staff of Kelco Co. During his 17 years with the paper firm, Mr. Bonanno was responsible for such operations as quality control, research and development, and manufacturing. He will serve as a technical representative for Kelco.

WILLIAM O. WILSON has retired as commercial vice president of Worthington Corp. He joined the firm in 1898 as a machinist at Jeanesville Iron Works Co. From 1937 to 1944 he was midwestern sales manager.

HARRY W. BRYSON JR. has been appointed sales service representative of Hooker Electrochemical Co. at Tacoma, Wash. His activities cover service on caustic soda, chlorine and ammonia.

D. D. CARR-HARRIS has joined the staff of Sutherland Refiner Corp., Trenton, N. J. He will serve as assistant to



NEW
GOULDS PUMP

GOULDS FIG. 3405 — Single stage, double suction centrifugal pump. Heads to 260 ft. Capacities to 6400 G.P.M. For general purpose pumping.

GIVES YOU 5 BIG COST ADVANTAGES

1 ***Combines seven design features that mean high operating efficiency and low maintenance.***

Every one of the following construction features is standard with this new design:

a. Renewable stuffing box bushings.
b. Bearing housings sealed against moisture and dirt.
c. Cowl-type glands suitable for use with quenching liquid.
d. Stainless-steel impeller keys.
e. Teflon water-seal rings.
f. Die-formed stuffing box packing.
g. Corrosion-resistant gland bolts.

2 ***Interchangeability of parts.***

Only three shafts and rotating parts assemblies provide for 19 pump sizes. This means you get:

a. Great flexibility in making field changes.
b. Low initial cost due to standardization of manufacture.
c. Reduced spare parts inventories.

3 ***Saves floor space.***

Short bearing spans cut over-all lengths as much as 50%.

4 ***Flexibility of stuffing box.***

You can use either conventional stuffing boxes or mechanical seals —and change from one to the other.

5 ***Easy rotation change.***

You can change from right- to left-hand rotation or vice versa in the field without construction change because of an unique device locking shaft sleeves.

GET FULL DETAILS from the 12-page illustrated bulletin, No. 721.6, covering the complete details of the new Goulds Fig. 3405, including specifications, interchangeability tables and performance curves. Be sure you have the whole cost-advantage story before you select another general purpose pump. Contact your nearest Goulds representative or write to Goulds Pumps, Inc., Seneca Falls, N. Y.

MEMBER

Goulds PUMPS INC.
Seneca Falls
New York

D. Manson Sutherland Jr. Mr. Carr-Harris was at one time associated with Anglo-Canadian Pulp & Paper Mills, where he assisted in the early development of Sutherland refiners. He was recently plant engineer at Columbia Cellulose.

D. D. Carr-Harris

G. S. Sangdahl

GEORGE S. SANGDAHL has been elected a vice president of Chicago Bridge & Iron Co. He joined the firm in 1913 in the sales department and was later manager of the Montreal office of the Canadian affiliate, Horton Steel Works Ltd. On May 4 he became manager of the new Pittsburgh office.

E. LANGFORD JONES has been named sales manager of the Virginia Cellulose Department of Hercules Powder Co.

National Starch Products Inc. has announced the election of *DONALD D. PASCAL* and *HERBERT C. PIEL* to fill vacancies on the board of directors. Mr. Pascal, who joined the firm in 1929, is vice president in charge of sales, while Mr. Piel is vice president in charge of the Indianapolis plant and has been with the firm and its Indianapolis predecessor, Piel Bros. Starch Co. Inc., for 45 years.

D. D. Pascal

J. T. Luscombe

JAMES T. LUSCOMBE, sales engineer with Beckman Instruments Inc. for the past two years, has been named sales manager for the California firm's Synchros Division. Beckman Synchros are precision electronic devices for automatic remote control and indication.

NORMAN E. SIEMS, a specialist in water and paper uses of silicates, has been named assistant sales manager of Philadelphia Quartz Co.

GILBERT J. SCHUELKE has been made assistant sales manager of the Chain and Transmission Division of Chain Belt Co., Milwaukee.

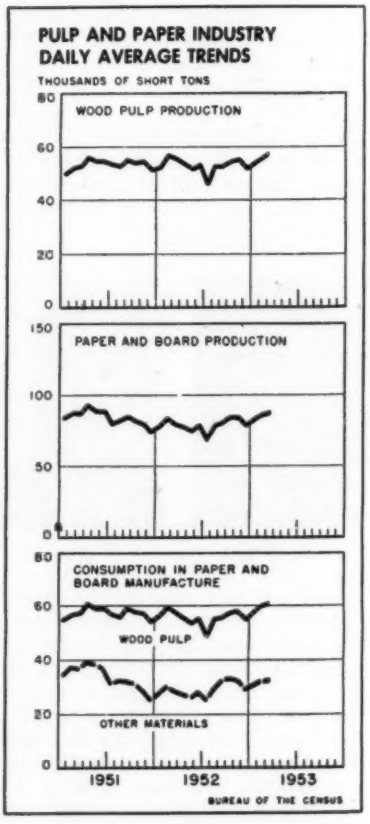
U. S. Paper and Paperboard Production

	Mar. 1953 (tons)	Feb. 1953 (tons)	Mar. 1952 (tons)	Total 1952* (1,000 tons)	Total 1947 tons)
Paper and Board, total	2,277,060	2,065,704	2,070,568	24,413	21,102
Paper, total	971,566	890,903	993,042	10,896	10,693
Newsprint	88,965	80,989	96,269	1,106	833
Groundwood paper (uncoated)	64,624	61,828	71,558	809	821
Printing and converting (coated)	100,956	92,368	98,765	1,096	
Book paper (uncoated)	141,514	128,043	130,174	1,482	2,208
Fine paper (writing, cover and text, bristols, thin paper and other)	108,326	99,778	124,033	1,295	1,172
Coarse paper (unbleached, kraft, glassine, greaseproof, vegetable parchment, and other)	293,058	266,787	307,066	3,235	2,903
Special industrial paper	36,318	32,504	38,311	396	289
Sanitary paper	107,468	98,561	98,887	1,148	894
Tissue paper	19,267	18,916	17,255	209	195
Absorbent paper	11,070	11,129	10,724	118	100
Paperboard, total	1,057,368	954,106	870,284	10,776	9,187
Containerboard, total	574,163	505,289	460,654	5,770	4,943
Liners	385,009	336,950	313,838	3,905	3,293
Corrugating material	161,718	142,293	125,720	1,583	1,370
Container chipboard	27,436	26,046	21,096	282	280
Bending board (folding boxboard)	305,940	285,131	256,429	2,194	2,249
Non-bending board (set-up boxboard)	75,951	69,711	65,221	687	595
Cardboard	13,102	12,845	7,521	69	92
Special paperboard stock	88,212	81,130	82,528	2,056	1,307
Wet machine board	14,123	12,609	10,663	137	150
Construction paper and board, total	234,003	208,086	196,579	22,603	2,349
Construction Paper	105,583	95,876	101,932	1,298	1,277
Hardboard and insulating board	128,420	112,210	94,647	1,305	1,072

(*) Preliminary report. *Source: U.S. Department of Commerce.*

March Pulp, Paper and Board Production

Paper and board production during March amounted to 2,277,060 tons, according to a report by the Bureau of the Census. This is an approximate 10 per cent increase over the tonnage of 2,070,568 produced in March a year ago. The output of paperboard grades during this month, amounting to 1,057,368 tons, reflected an increase of 12 per cent over the production of 870,284 tons reported during March 1952. Paper production, which amounted to 971,566 tons, registered a slight decrease from the 993,042 tons of March a year ago.



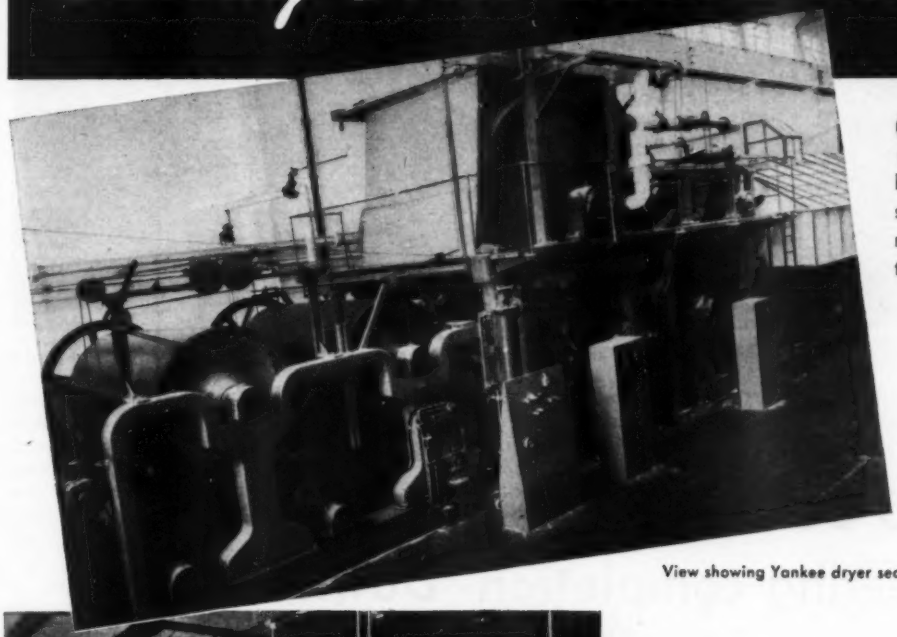
Pulpwood receipts at the pulp mills during March amounted to 2,266,793 cords, with consumption at 2,406,926 cords. Month-end inventories decreased slightly to 5,993,638 cords.

Wood pulp production during March was 1,504,857 tons, as compared to 1,449,740 tons a year before.

Wood pulp inventories at the end of March at paper and board mills were 541,017 tons, as compared to the 553,802 tons reported at the end of February. Month-end stocks at pulp mills amounted to 157,633 tons, reflecting a 7 per cent increase.

Leading the Way to Greater Production!

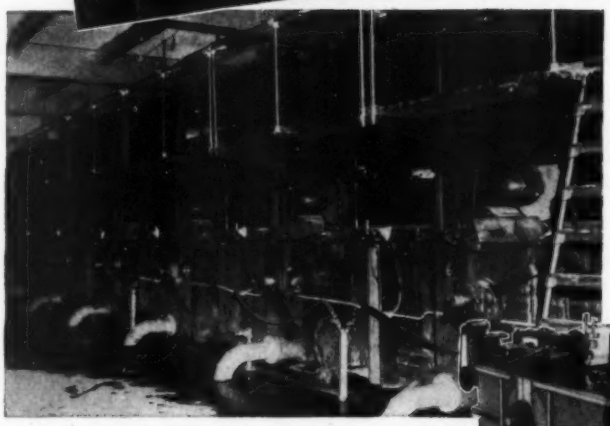
Sandy Hill Board Machines



View showing Yankee dryer section.

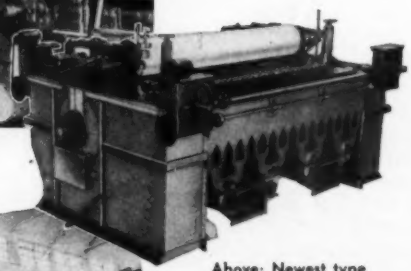
Sandy Hill engineering "know-how", designing and production skill are responsible for the many outstanding features in the new Board Machines:

- Uniform weight and caliper and smoothness for good printability for *all types of board.*
- Production at *high* board machine speeds



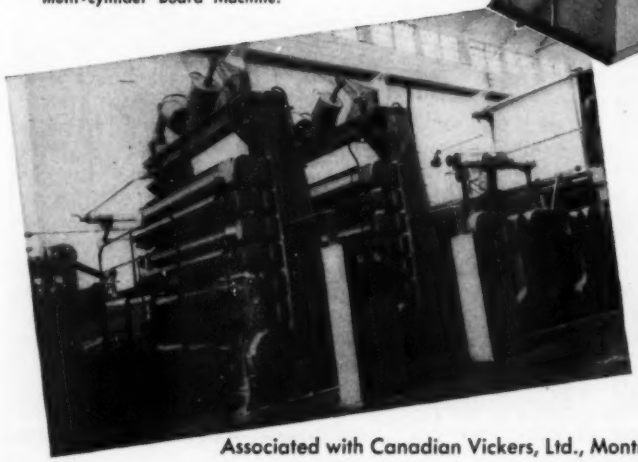
Above: Conventional vat arrangement on typical Sandy Hill multi-cylinder Board Machine.

The Sandy Hill multi-cylinder Board Machine can be designed to meet the individual requirements of your mill. It may be built, for example, with more or fewer vats, a mill-determined number of presses, dryers or calenders, or such variations as may be decided by consultation between the men who use it and the men who build it.



Above: Newest type Cylinder Vat with movable mould and Sandy Hill-Bertrams manifold inlet.

These board machines in their basic design incorporate many features of Sandy Hill conception, such as multiple manifold stock delivery to the vat, movable cylinder moulds, open and accessible dryer framing, open-side calender framing, Yankee dryer and the selective drive.



At left: Open-side Calenders with new Sandy Hill anti-friction bearings and pneumatic load and lift.

The *Sandy Hill* IRON & BRASS WORKS

PAPER MACHINERY SPECIALISTS • HUDSON FALLS, N. Y.

Associated with Canadian Vickers, Ltd., Montreal, Builders of Sandy Hill Designed Machinery in Canada

New Zealand's first chemical pulp industry: pulp and paper mills and worker's huts in center and right, with sawmill in left foreground

25,000-ton project nearing completion "Down Under"

J. T. CHRISTIANSEN
Mills Superintendent
N. Z. Forest Products Ltd.

THE LARGEST timber utilization project in the Southern Hemisphere is now nearing completion at Kinleith on New Zealand's North Island. Comprising kraft pulp and paper mills and associated sawmills, the operation is an undertaking of N. Z. Forest Products Ltd.

Full production of 25,000 annual tons is expected before the end of 1953. Sack kraft and linerboard will be the principal products, with plans for future expansion calling for the output of lightweight wrappings and board up to 25-point.

In addition to its Kinleith mills, N. Z. Forest Products currently owns and operates three sawmills in the forest area and a number of plants for fiber wallboard, multiwall paper bags, and containers at Auckland. Raw material is brought to the operations from the firm's plantations of Monterey pine. Altogether, the company operates 176,000 acres of timberlands.

Log handling

The top logs of planted Monterey pines are hauled by truck from the plantations to the mill site, where they are dumped on log skids. They are then rolled to a chain and cut by a crosscut to 20-ft. lengths, after which they are cut to 5-ft. lengths by slash saws. From the slasher table a chain conveyor moves them either to storage or directly to a belt conveyor discharging into the barking drum.

Barking and chipping

Logs averaging approximately 10 in. in diameter (20 in. is the maximum) pass through a barking drum reported to be one of the largest in the world. The unit is 20 ft. in diameter by 46 ft. in length and is powered by a 100 hp motor.

Wet barking is employed, and the shredded bark is pressed in a Wilen screw press to 50 per cent dryness before being burned as boiler fuel. The barked logs are discharged to a 36-in. belt for transport to the 120-in. diameter 275 hp chipper, which was supplied by Karlstad of Sweden. Provision is made for the return of insufficiently barked logs to the drum.

Leaving the chipper, the chips are elevated and distributed to two sets of 4- by 12-ft. oscillating screens, which are Karlstad products. Oversize chips are refined in a distintegrator of hammer mill type and then dropped to the acceptable chips belt of rubber construction on which they are conveyed a distance of 1,400 ft. to the chip bins. Fines and sawdust, together with the bark from the Wilen press, reach the boiler house via a rubber belt.

All of the 20 conveyors in the mill were designed by N. Z. Forest Products' staff engineers; the conveyor structures were manufactured in New Zealand by William Cable Ltd., and the mechanical parts—such as trippers—were supplied by Jeffrey Mfg. Co. Ltd. of Canada.

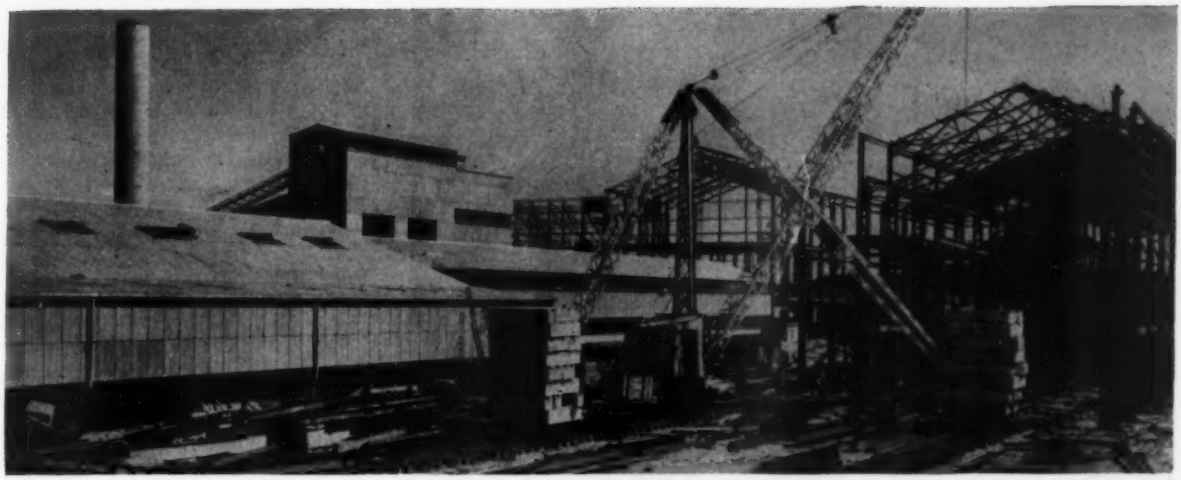
Chips are discharged through a self-propelled tripper into a rectangular chip bin of a 24-hour holding capacity.

Cooking, washing and screening

From the chip bin, chips are discharged through a double-screw traveling feeder onto a 36-in. inclined belt, in which a Weightometer has been incorporated, for transport to the six vertical 2,200-cu. ft. digesters. The digesters are welded and manufactured by Thompsons of Castlemaine, Australia, or M. A. N. of Germany.

There are six Morterud systems for indirectly heating and circulating the cooking liquors. The six blow-valves are hydraulically operated and remotely controlled.

The blow-tank, which has a 25-ft. diameter and is 55 ft. high, has a six-cook capacity, is of conventional design,



Warehouse, uptaking section and boiler house nearing completion; framework of the digester house in center, with paper mill to the right

and is equipped with an Improved Machinery Co. agitator. The steam heat from a "blow" is recovered in a Rosenblad system, which consists of a 3- by 8-ft. spray condenser, two stainless steel spiral condensers, and a 6,000-cu. ft. hot water accumulator.

From the blow-tank, stock is pumped to two Johnson knotters, which are ahead of three 8-ft. diameter by 10-ft. IMPCO brown stock washers in series. The washers are equipped with the following cylindrical tanks:

1. First-stage black liquor — 28-ft. diameter by 25 ft. high
2. Second-stage black liquor — 26-ft. diameter by 25 ft. high
3. Third-stage black liquor — 25-ft. diameter by 25 ft. high
4. Foam tank—16-ft. diameter by 50 ft. high

The foam tank is equipped with an IMPCO foam breaker.

In addition to the equipment listed above, the operation incorporates a warm-water tank and a hot-water tank. The hot water at 190°F., used on the washers and the Kamyr uptaking machine, is produced entirely from reclaimed heat, not a single pound of fresh steam being used. Instrumentation is made by the Industrial Division of Minneapolis-Honeywell Regulator Co.; pumps are supplied by Thompsons of Australia and Harland Engineering Co., Ltd. of England.

Washed stock passes to a concrete stock chest of Kamyr type that has a horizontal agitator and two mid-feathers.

From this stock chest, the pulp is pumped at 3-4 per cent concentration to a head box ahead of the fine screens, there being diluted to 0.5-0.7 per cent consistency with fresh water and reclaimed backwater. The two centrifugal fine screens are 4-ft. diameter by 6 ft. Biffars, each with 0.079-in., 0.070-in., and 0.063-in. perforations. On leaving the fine screens the stock is concentrated either in a valveless decker—if going to the pulp machine—or on a Kamyr suction filter—if destined for the paper mill.

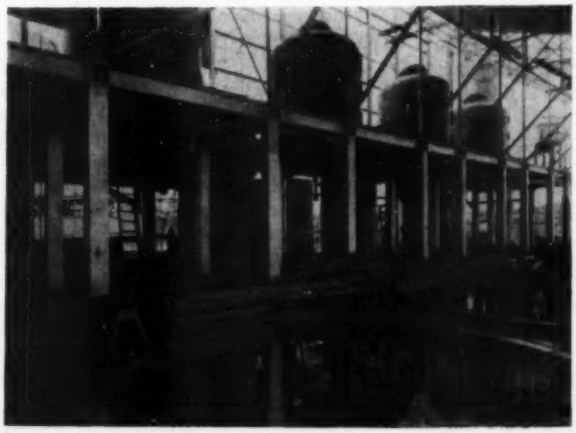
Paper machine

About half of the pulp production is slushed through a 9,000-cu. ft. chest and then through a suction filter to the refiner chest, from whence it is pumped through seven Morden Machines Co. Stock-Makers and four Shartle Bros. Machine Co. Miami jordans to the paper machine. An 18-ft. diameter Hydrapulper by Dilts Machine Works is used for baled pulp.

Size is prepared according to the Delthirna system, while the continuous size and alum proportioning equipment is supplied by Fischer & Porter Co.

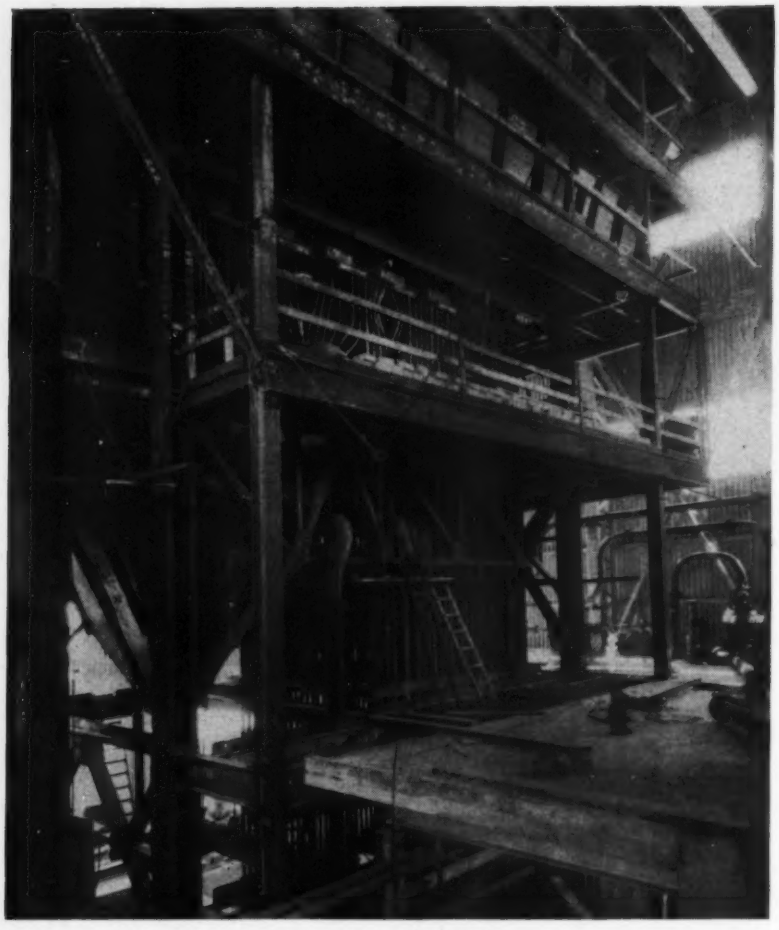
The machine—manufactured by Walmsleys (Bury) Ltd.—has a trim width of 120 in., a wire 90 ft. in length, with a suction couch, two suction presses, and a smoothing press, followed by 34 dryers of 5-ft. diameter. There are two calender stacks—with two additional dryers between them—and a Pope reel. The drive is by Harland Drives Ltd. The maximum speed of the machine is 1,000 fpm, with provision for extension to 1,150 fpm.

Included in the operation are an A. E. Broughton & Co. vacuum system, pumps by Nash Engineering Co., and eight felt dryers. The rewinder is by Walmsleys



Installation of separators and evaporators

Installation of mill machinery and equipment



Interior view of chemical recovery unit at the Kinleith mill

and is designed for 2,500 fpm and 40-in. rolls.

Pulp drying

Surplus pulp is formed on a Kamyr suction mould of 7-ft. diameter and 11-ft. width. It passes through two feltless high-pressure presses with two intermediate steam dryers and then into a Flakt dryer. The presses are pneumatically controlled. The Kamyr machine is by Karhula Ltd. of Finland, while the dc sectional drive is by Brown-Bovery of Norway. Parts of the Flakt dryer are made in Sweden and parts in New Zealand, with assembly at the mill.

The dimensions of the dryer are: 94 ft. long and 128 in. wide, with 13 decks. It is followed by a hydraulically-operated layboy and a baling press. A complete heat-recovery system by Svenska Flaktfabriken is installed.

Pulp bales are handled by fork lift truck and stored in a warehouse of 3,000-ton capacity, whereas the paper rolls are handled in a separate area by an overhead crane.

All power for the mill—7,000 kw in all—is purchased from government-operated hydroelectric generating plants. It is delivered to a substation on the mill area. No steam power, therefore, is produced.

Process steam is generated in three boilers. The largest is a vertical tube soda recovery unit by The Babcock & Wilcox Co. It is designed to generate 50,000 lb. steam per hour when burning 350,000 lb. dry black liquor solids per day. The unit is equipped with a cast iron economizer and air heater supplied by E. Green & Son Ltd. of England. Steam pressure is 220 psi, and the pressure is reduced by British Arca reducers. The total heating surface of the recovery unit is 30,000 sq. ft.

Flue gases leaving the economizer at 300°F. pass through an Elex electrostatic precipitator manufactured by W. Holmes Ltd., England. The precipitator is designed to handle 50,000 cu. ft. per minute of gases and to give a recovery of at least 95 per cent.

The housing of the precipitator is of concrete with a semi-acid-proof brick lining. Make-up salt cake is proportioned through a Waytrol proportioner by Jeffrey Mfg. Co.

The two primary boilers are supplied by J. Thompson, England. Each is of 40,000 lb. per hour steaming capacity, and one is equipped with a 13- by 18-ft. traveling chain; the grate and stoker are designed primarily for local coal, although wood waste can also be fired. The other unit is provided with a special stepped grate furnace designed to burn wet wood waste. Continuous ash disposal is by means of a submerged belt conveyor.

Liquor recovery

The five-effect, five-body black liquor evaporators each have 750 tubes 23 ft. in length. Each has a large—1,300 cu. ft.—separator designed to ensure good separation and clean vapor. The liquor is concentrated to 62 per cent solids before being pumped to the recovery unit.

The flow of liquor in the effects is 3, 4, 5, 1, 2, and the steam and vapor flow is 1, 2, 3, 4, 5; the heat from the last-effect vapor is recovered in a Rosenblad system; and a substantial quantity of clean warm water for processing is thus produced.

Causticising and lime kiln

The causticising operation is of conventional Dorr continuous design, with four-compartment green and white liquor clarifiers each 20 by 20 ft.; a slasher-classifier by The Dorr Co., three 9- by 9-ft. causticisers, and a cylindrical slaker filter 6 by 4 ft. manufactured by Oliver United Filters Inc.

The sludge washer is a four-compartment, two-stage, 20- by 20-ft. unit, while the green liquor dregs washer is of four-stage, four-compartment, 14- by 20-ft. design.

Reburned lime is proportioned through a screw-conveyor driven by a commutator motor remotely controlled.

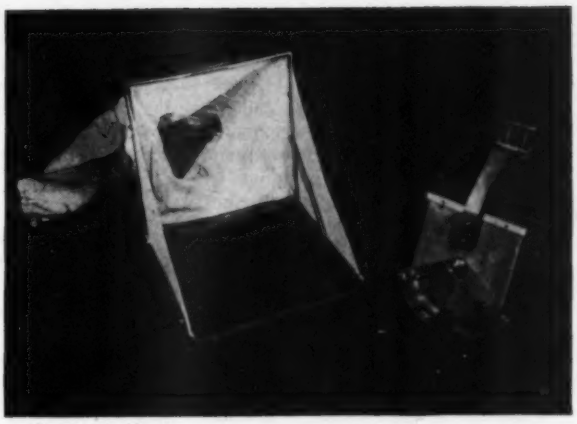
The kiln is 7½-ft diameter by 130 ft. and was manufactured by Vickers-Armstrong of England.

As alternate supplies of sub-bituminous coal are locally available (whereas imported oil is expensive), a 9-ft. gas-producer by Power Gas Corp. is installed, and oil is used only in an emergency.

General

About 40,000 ft. of piping has been used throughout the mill, most of it having been purchased in random lengths and welded on the site. There are 800 valves, 400 of them made by Saunders Valve Co. Ltd. All the 50 tanks, including the Door clarifiers, blow-tanks, etc., have been fabricated in New Zealand and welded on the site.

All buildings are of steel covered with an asbestos-cement sheeting and have suspended concrete floors. Raw-process water is pumped from a stream 4 miles from the mill by way of a 32-in. pipeline designed for a capacity of 17,640,000 gal. per day.



Apparatus for sampling organisms in streams; the Surbur sampler (left) captures for classification and counting the organisms living on square foot of bottom surface; the Eckman dredge is used to take samples of the bottom soil

Progress in stream improvement

Part 3—Problems resulting from paper mill wastes and the measurement of stream quality

This concludes the author's series of articles dealing with the latest developments in methods for combatting stream pollution. Part 1, which appeared in the March issue of *The Paper Industry* discussed the problem of sulfite liquor wastes. In Part 2, appearing in April, the author concerned himself with the problem of kraft pulping wastes, semichemical spent liquor, deinking wastes, and straw pulping wastes.

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WHITE WATER DISPOSAL, the perennial problem of the paper industry, has received its share of attention in the overall industry-wide campaign for stream improvement. In recent years a great deal of work has been done by individual mills in the phases of closing up the machine systems and recirculating a maximum amount of white water. This has, of course, aggravated the slime control problem, but the latter has been mitigated by extended experience in the use of mill antiseptics.

Coupled with the closing of the machine systems has been the development of improved types of savealls so that, generally speaking, each year has seen some reduction in fiber and other machine losses.

Treatment of white water involves the removal of fines, filler, materials in colloidal suspension, and the like. Generally this treatment has taken the form of three approaches—flotation, sedimentation, and filtration. All three may or may not depend upon the addition of a flocculating agent or agents and, generally speaking, the operating cost is in proportion to the effectiveness of removal (84).

The flotation type of saveall seems to have come into rather wide use in the paper industry over recent years (85, 86). Easton and Baum (87) have discussed the Sveen-Pederson saveall, which is of this type. They stated that experience with more than 100 operating installations in the United States has shown that the primary advantages of the Sveen-Pederson are: (1) time of circulation through the saveall is short; (2) the efficiency is high even on heavily loaded or slow stock; (3) the saveall can be easily cleaned; (4) low maintenance cost and no shutdowns, and (5) fluctuations in flow and consistency may be handled. Thompson (88) discussed the installation of this type of saveall at the Milltown, N. J., plant of Personal Products Corp. Each machine has a 500-gallon unit, and the influent contains 18 pounds of stock per 1000 gallons. It is stated that each unit recovers six tons of stock per day, 720,000 gallons of waste per day are treated and clarified, and there is approximately 100 per cent solids removal. The cost of chemicals is said to be about $2.95 per ton and the cost of clarifying the water $0.025 per 1,000 gallons.

Richardson (89) discusses further the operation of the Sveen-Pederson type saveall, possible difficulties in its use, and ways of avoiding them.

At least two other flotation types of savealls—the Adka and Savalla—are in use in the paper industry. Niberger and Bodette (90) have described the operation of a Savalla at the Deferiet mill of St. Regis Paper Co., which has an average recovery efficiency of 98 per cent.

According to Gustaffson (91), the performance of these two types (Adka and Savalla) closely approximates that of the Sveen-Pederson.

It has long been known that white water can be clarified and fiber recovered by plain settling or sedimentation. Very often this process may be accelerated by the addition of flocculating chemicals. The simplest type of installation is a plain tank acting as a settling basin. The settled solids can be removed in a number of ways (92, 93). Bechtel (94) studied the effect of a number of variables on the rate and completeness of white water sedimentation. By adjusting to a suitable pH, he was able to reduce solids from 5.39 to 0.76 pounds per 1,000 gallons in 30 minutes. Erspamer and Rice (95) described a process involving sedimentation with or without chemical flocculation, followed by a rather rapid process of sludge dewatering and compaction. These authors reported 60 per cent reduction in turbidity, 85 per cent reduction of suspended solids, and 98 per cent reduction of settleable solids by plain settling for two hours. Kahn (96) and Kominek (97) described a rapid rate sedimentation unit (Cyclator) which, operating in a board mill, is said to have reduced fiber losses to about 0.1 per cent. There are some operational difficulties caused by entrained air or thermal upsets which may entail the installation of additional equipment.

Applebaum (98) has described a "reclaimer" which operates on the principle of the Spaulding precipitator. It operates by upward filtration through a live blanket of suspended solids which it has recovered from the white water. Fiber recovery is said to be 97 per cent. Carpenter and Porter (99) have reported

their experience with a Spaulding type precipitator. A 1200-gallon per minute industrial size unit was developed which takes feed water containing two or three pounds of solids per thousands gallons and delivers a clarified effluent containing 0.1 pound or less per thousand gallons. It is stated that the operation is continuous and trouble-free and that no extraneous chemicals or flocculating agents are required. The Accelerator Clarifier has also been described (100). This installation, at the Downington Paper Mfg. Co. plant, operates on the principle of increased particle size by recirculation of slurry with incoming raw waste.

Treatment of white water by filtration is carried out in a number of ways. One principle is to pass white water through a screen cylinder by force generated by differential in water levels. As the water passes through a layer of fiber is built up on the screen and this increases the efficiency. One such device, the Waco filter, is described by Wadleigh and Simons (101). Four of these filters are designed to process 600 gallons of waste water per minute on high consistency waste, and may go as high as 1,400 gallons per minute on leaner wastes; 90 per cent fiber recovery is accomplished.

The vacuum-type filter has been discussed by King (102). A precoat is formed on the cylinder, as in the case of the Waco but, because of the vacuum, the impelling force may be stronger than if caused by difference in liquid level. Using an Oliver filter for this purpose, Sperry (103) reported a reduction in fiber loss from 8 to 0.46 ton per week. The OCO water system is based on a plate and frame type of filter and a filter aid. Ehemann, *et al* (104) have discussed this system and stated that it offers a practical solution to the problem of recovery of industrial process water and should offer a means of conserving water, fibers, filler, and heat in white water.

Persons familiar with machine water systems are aware that there is much variation in furnish and, therefore, a resulting variation in the character of white water. A number of different methods and devices have been discussed above, all designed to remove solids from white water. It becomes apparent that the use of any one of these for all types of white water would be impractical. For example, waters containing a high percentage of inert and relatively heavy materials, such as clay, might best be treated by a process where the force of gravity plays an important role. On the other hand, if the solids are of such a nature as to be effectively entrained on a minute air bubble, it is altogether likely that the flotation type of machine would be indicated.

In the last analysis the type of machine to be installed will depend on the type of water to be treated. Coupled with this strictly technical aspect will be the economics of the operation, as well as the effectiveness in producing a final water which can be reused or passed to the stream without ill effects.

Methods for measurement of stream quality

The traditional test employed by sanitary chemists for determining the oxygen demand of sewage is the Biochemical Oxygen Demand (B.O.D.) test. When wastes containing substances available to bacteria and other stream micro-organisms are passed to a stream, the micro-organisms in that stream absorb those substances and oxidize them within their cells. The oxygen so used is "biochemical oxygen," and the amount necessary to completely oxidize the waste is said to be Biochemical Oxygen Demand.

This process, which takes place in the stream, has been simulated in the laboratory to become the B.O.D. test. Under closely controlled conditions the amount of oxygen used by bacterial and other forms in an incubated sample of waste is measured and, from that amount of oxygen, the total oxygen demand can be calculated.

It is obvious that this test depends on the physiological activity of micro-organisms, and it follows that, if the wastes to be measured contain materials toxic to these forms, the results of the test would be misleading.

McGrath (105) has explored the use of this test for measuring the B.O.D. of paper mill wastes. She states that, with the best of practices, the method is accurate to within 10 per cent, but that it is an excellent measure of what is to be expected when paper mill wastes are discharged into a natural stream.

Gehm (106) investigated the uses and shortcomings of the B.O.D. test in relation to its use for pulp and paper mill effluents. He made recommendations regarding modifications and discussed the application of the test to specific mill problems. Rogers (107) suggested that the results of the test could be formalized by a simple calculation to 50 per cent oxygen depletion.

One of the moot questions concerning the measurement of the oxygen demand of an industrial waste is whether the "oxygen consumed by permanganate" test (O.C.) can be substituted for, or correlated with, the B.O.D. test. Chesley, *et al.* (108) have made such a correlative study and concluded that, within a range of 54 to 436 p.p.m. of O.C., B.O.D. values can be reliably calculated. On the other hand Schmidt (109), working with spent sulfite liquor, stated that his data indicate that the methods for determining permanganate consumption are not applicable to the evaluation of pollution characteristics of that waste when it is passed to the stream.

Caldwell and Langelier (110) have described a method for B.O.D. determination of sewage by manometric techniques. They found that the 24-hour oxygen consumption at 25°C. was about the same as 75 per cent of the conventional five-day B.O.D. values. The apparatus for this method—they recommended the use of the Warburg Apparatus—is said to provide facilities for controlling variables which heretofore have resulted in inaccurate results. They pointed out, further, that present commercial equipment is expensive and requires a trained operator and expressed the hope that a simpler and less expensive modification can be developed.

Over the past few years there has been renewed interest in the use of biology in measuring stream quality. Twenty to 30 years ago the biological method was described by Shelford (111), Richardson (112), Suter and Moore (113), Baker (114), and Turner (115). Interest in it has been renewed in recent years. Papers dealing with the evaluation of stream conditions by this method have been published by Lackey (116), Bartsch (117), Tarzewell (118), Van Horn (119, 120), Patrick (121), Doudoroff (122), Gaufin and Tarzewell (123), and Mills (124). These workers all seem to agree on one point—namely, that biology can be a useful tool in evaluating (a) pollution and (b) degree of stream improvement. There is some difference of opinion as to which forms are best adapted as "indicators" and the degree to which the method is significant. These divergent opinions appear to have their origin in attempts to generalize the biological approach and in failure to recognize the fact that each stream must be treated as an entity unto itself, that findings in one stream are not necessarily valid for all others.

The problem of toxicity in the pulp and paper industry is not as great as it is in some other industries. Bioassay methods, however, are helpful in determining the character of certain wastes and what will happen to the stream environment when those wastes are added to it. Hart, *et al.* (125) and Doudoroff, *et al.* (126) have formalized the procedures which seem best suited to conduct toxicity investigations.

The uses of the biological method can be summarized by stating that (1) the method is not intended to replace but rather to supplement other types of measurement, such as chemical; (2) biological observations are often useful in providing a better idea of what the history of pollution of a stream has been over extended periods, and (3) a remedial measure, to be useful, must result in stream improvement, and that this improvement in the last analysis can be

measured most effectively by the biological method.

Hedgepeth (127) has presented a general point of view. He said, "the base from which stream pollution is viewed has broadened considerably. This has brought technical groups into the picture other than biologists and sanitary engineers. These new groups are not impressed by the dogmas and sacred cows of sanitary engineers trained and experienced in water and sewage treatment. No universal measure of stream pollution is recognized. The indiscriminate use of so-called standard methods for chlorine demand and 20° B.O.D. are selected as examples of deficient methods of predicting the effect of an industrial waste on a stream. He voices strong objections of half-truth tactics. The need for a workable regulatory philosophy is expressed because some measure of stream pollution due to industry will always be present. Arbitrary adherence to a code of performance and past practice should be secondary to the facts in each case."*

Hoak (128) agrees in principle with Hedgepeth and says, "Our knowledge of the specific effects on stream ecology of most materials regarded as pollutants is rather meager, and the data we have is limited to fairly definite conditions. For this reason it seems illogical and uneconomical to set arbitrary limits for various constituents of plant effluents where knowledge of their effects is lacking. Such requirements are somewhat more defensible if they relate to the concentration of a given waste component after thorough dispersion in the receiving water."

Hoak felt that certain of the physical and chemical factors that affect aquatic life might be combined to provide a broad index of stream condition. He suggested that, if temperature, pH, dissolved solids, dissolved oxygen, turbidity, color, stream stage and effluent discharge were continuously recorded, the data might be more significant than those from the use of current methods. He pointed out that devices for measuring all of these factors, excepting turbidity and color, are available.

Summary

In the order of their importance the three problems in stream improvement facing the pulp and paper industry are (1) maintaining an adequate oxygen balance in the receiving water; (2) reducing to a practical minimum the loss of inert solids, and (3) the elimination of toxic materials from waste waters. Of these three, the first two are of much greater importance.

The approaches to the problem of the major pulping segments of the industry have been reviewed. For the most part these are related to the problem of oxygen balance. The work in reducing fiber loss and the amount of potentially toxic wastes has also been discussed.

From this discussion it is apparent that the pulp and paper industry has done many things, and has done them well, to solve its problem in stream improvement. Much remains to be done, however, and the industry is doing it on a rational and vigorous basis.

*Quoted from an abstract by W. K. Eglof in *Public Health Engineering Abstracts* 32, No. 12:15.

Acknowledgment

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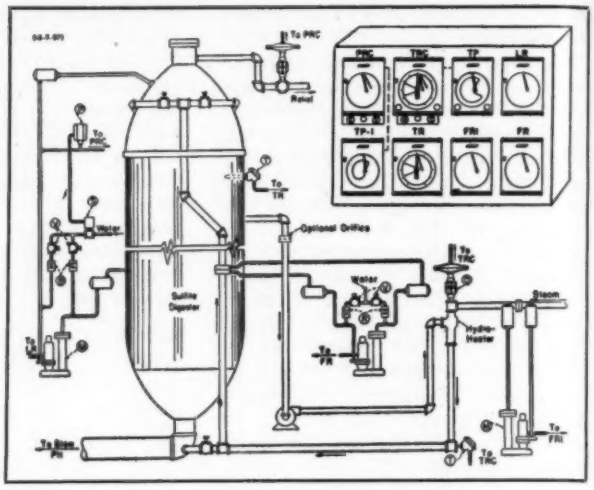
Fig. 1—Brown electronic instruments used for control of Chemipulp direct cook digester. (Legend: PRCI, recording pressure controller with indexet; TRCI, recording temperature controller with indexet; FRI, recording flow integrator; TP, time-pattern transmitter; TR, temperature recorder; LR, level recorder; FR, flow recorder; D, diaphragm motor valve; M, electric meter body; P, pneumatic-electric relay; S, solenoid valve; T, thermocouple; R, flowrator, and V, regulating valve)



Progress in automatic control

LEO WALTER*

IN THE FOLLOWING a few automatic control methods will be described as used in various countries where pulp and papermaking has been developed to a fine art. It is assumed that the reader is familiar with the basic control theory as applied to pulp and papermaking equipment. A few typical applications of modern automatic control methods have been chosen at random, and the process variables (processing factors to be controlled) are those of main interest to the paper mill engineer.

Among temperature control problems, melter temperature for sulfur storage and combustion temperature of the burner are two instances where thermostatic control is easily applicable. By fitting diaphragm control valves into the steam supply to the sulfur melter and molten sulfur storage tank, and by installing thermocouples into the sulfur, adequate thermostatic control can be achieved, and smooth flow of constant strength SO_2 secured. Addition of a sulfur dioxide analyser will complete the installation. From the various applicable methods of acid plant control, level and pressure control of pressure towers (Jenssen) is now applied by means of electronic recorder controllers. Nearly all prominent instrument makers have developed their own methods of digester control, applied to acid or alkaline plants. As an example, Fig. 1 illustrates automatic control of a Chemipulp-KC direct cook digester, allowing variation of cooking schedules by using a temperature-time pattern recorder controller. PRCI is a recording pressure controller with diaphragm control valve for relief. A temperature recorder controller TRCI regulates steam admission, having its thermocouple TC inserted in a pipe elbow of the circulation pipe. TP is a time-pattern transmitter with cam attachment cut out following a predetermined temperature-time schedule. Control cubicles for semichemical pulping today use mainly electronic controllers.

As an example of the various control systems for multiple effect evaporators, Fig. 2 shows a typical control scheme for a sextuple effect evaporator. The legend beneath the illustration indicates the various controls used, and the process variables which are measured and controlled range from flow, pressure, and temperature to liquid level and conductivity. Flow ratio control is applied between the fifth and sixth stage to produce balanced flow conditions. The wide use of continuous peroxide bleach plants brought in their stride application of control cubicles, performing the jobs as indicated in scheme Fig. 3. This shows partial instrumentation of a six stage bleach plant with chlorination tower, first caustic H.D. tower, L.D. SO_2 tower; and a consistency regulator and stock meter are used. The number of process variables demands centralized control, and standard instruments are used so far. The present trend of inserting miniature instruments of the indicating and recording type in a graphic flow sheet, however, makes it likely that future developments will use in conjunction with the master control cubicle several separate graphic control desks. Each electronic control unit is mounted separately on a retractable tray and is thus easily accessible from the back of the instrument panel.

Stock flow metering

Among the many problems encountered in papermaking is stock flow metering. Experience has shown, however, that no stock flow metering should be considered unless adequate consistency control is provided. Variations of stock consistency would introduce too many additional process variables into a problem which already offers plenty of scope for care and ingenuity. One of the difficulties encountered is to produce a pressure-tight consistency regulator, and, as far as the writer is aware, there are very few being made, perhaps one or two types in the United States and in Britain and one design in Sweden. All other consistency regulators acquire an overflow, which provides a draw-back for automatic control. As an example, in one plant a consistency controller of the circular chart type is located in a cubicle and is pneumatically operated. It works on a digestion tower (Cellulose Development Corp.) and controls blow tank consistency. The fundamental control problems are to maintain a material balance between the solid and liquor content by means of control of the dilution liquor, under conditions of continuous flow.

In applying automatic control to a process of this nature a dependent control variable must be chosen which will be indicative of the chemical or physical conditions of the material in the process, and the blow tank control problem resolves itself into controlling the solid contents of the pulp supply to the washer. It is obviously impossible to make individual determinations of consistency and subsequent valve adjustments to obtain control. A variable has to be selected whose measurement reflects the actual valve of consistency and does so in a direct and constant relationship. In the construction of a blow tank incorporating a set of motor driven agitator blades, consistency can be reduced to a measured variable through a series of dependent variables such as viscosity. Viscosity is determined by measuring the shearing force on the agitator blades or the power input to the agitator motor, and blow pit controls generally evolve round the measurement of the power input to the agitator motor.

Sweden being one of the oldest producers of pulp and paper, its control instrument firms are quite advanced in instrument design. For example, the Kaelle system uses dilution of oil with air bubbles in its hydraulic control methods. Fig. 4 shows the layout and automatic control method of density of paper pulp by means of a cyclone type indica-

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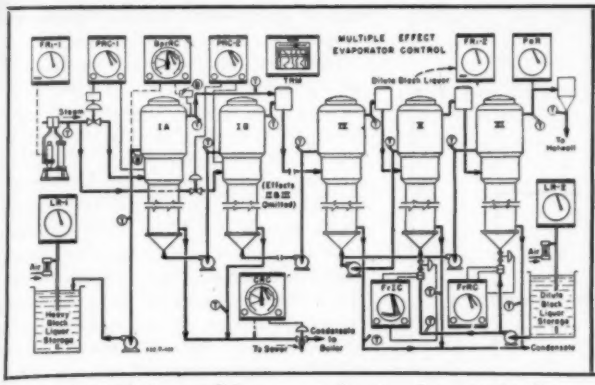


Fig. 2—Typical Honeywell-Brown control system for sextuple-effect evaporator using flow-ratio electronic control. (Legend: FRI, recording flow integrator; PRC, recording pressure controller; BpRC, boiling point rise controller; TRM, multiple temperature recorder; PaR, absolute pressure recorder; LR, liquid level recorder; CRC, conductivity controller; FrIC, indicating flow ratio controller; FrRC, recording flow ratio controller, and T, thermocouple)

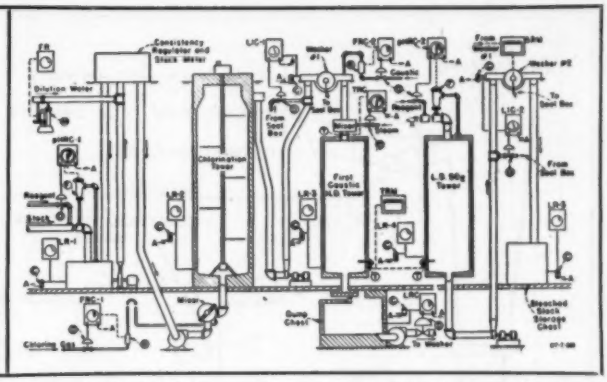


Fig. 3—Partial instrumentation, six-stage bleach plant. (Legend: FR, flow recorder; pHRC, recording pH controller; D, diaphragm motor valve; LR, level recorder; FRC recording flow controller; LIC, indicating level controller; A, compressed air; M, electric meter body; C, C-clamp flowrator; TRC, ElectroniK temperature recording controller; T, thermocouple; TRM, multiple ElectroniK temperature recorder; LRC, recording level controller; F, flow type pH electrode asembly; SRM, multiple record tachometer, and R, differential converter flow transmitter

tor and detector, which gives a sampled portion of the pulp a rotating movement within a cylinder. The level of this rotating paper pulp mass will vary with density of the product. This variation of level is utilized for automatic control and for admission of sufficient water for diluting the paper pulp as desired.

For blow pits the variations in the power input alter the amount of dilution liquor being fed to the blow pit, with the result that a consistent product is maintained. One form of blow pit æcontrol is illustrated in Fig. 5. In this the power input to the agitator motor is measured by a power unit (3) whose output is picked up by a repeater unit (2) and transmitted to a Pyro-master potentiometer controller (1). The total power is measured by the pyrometer, and a free vane pneumatic control unit is actuated to position a control valve (6) in the dilution liquor line. Basically the free vane control unit consists of a thin stainless steel vane operating between a pair of opposing air jets. The position of the vane in relation to these jets is determined by the valve measured by the potentiometer, in this case the measurement being power in watts or kilowatts.

As the consistency increases the power consumption of the agitator motor increases, and the potentiometer carries the free vane unit between the opposing jets of air so that there is a restriction of air flow. This restriction of air flow builds up the pressure in a pneumatic relay system which imposes a corrective air pressure on the diaphragm of the control valve so as to regulate the amount of flow of dilution liquor. The correction imposed on the control valve is proportional to the amount of departure of the power reading from the preselected control point.

In many processes automatic rate of flow is important, but positive displacement meters have now given way to venturi-tube head-meters, where rate-of-stock is concerned. Apart from low cost and small size they require neither overflow nor vents to atmosphere.

Flow and blending control of pulp stock

Usually a venturi flowmeter is applied to measurement and control of stock flow between the blow tank and wash room. The throat of venturi tubes for stock flow measurement should be made of stainless steel to prevent erosion. The differential pressure developed by the venturi tube is connected by two half-inch impulse pipes to the manometer of flow-indicating pneumatic transmitter. It is necessary to use a dependable, continuous water purge to prevent the pulp fibers from plugging the small diameter impulse pipes. A completely reliable source of purging water, at pressures well above the pressure in the stock line, is required. Hand needle valves and rotameter-type flow indicators are used to regulate the rate of flow of the purging water.

The flow indicating transmitter should be mounted as close as possible to the venturi tube. This minimizes the length of the impulse piping. The air output from the flow meter is connected by bendable copper tubing to the flow recording controller-receiver. This flow receiver can be located at any convenient point such as the wash room instrument panel.

Alternate method by stock pump control

Several pump mills have eliminated the control valves described above for stock flow control and are using a controlled hydraulic coupling on the stock pump (Fig. 6). This alternate method of control increases the pumping efficiency by directly controlling the rate of pumping. The output air pressure from the flow controller is connected to a diaphragm lever operator which varies the setting of the hydraulic coupling connecting the stock pump to its driving motor. To obtain good flow rate control, the stock pump used must have an approximately linear relationship between rate of revolution and rate of pumping and should not be much larger than is required to pump the maximum flow anticipated.

Stock blending control

The elimination of batch processes by continuous refining systems throughout the paper mill has made automatic continuous stock blending, or proportioning, important. As with stock metering, stock blending in the past was accomplished by means of two or more positive displacement stock meters which were set to deliver the desired proportions. The same disadvantages of stock meters for flow control which are listed above hold true for blending control. In addition, stock meters provide no direct setting of the ratio between the proportional flows. The same methods of stock flow control by venturi flowmeters, which are described above, can be used for flow ratio control systems.

Fully automatic control of the blending groundwood stock with sulfite stock uses a flow ratio control system. This same general system of ratio control can be applied to regulation of any stock blending process throughout the mill. Several stocks can be included in the system. In the ratio control system, the flow of sulfite stock is taken as the supervisory flow; that is, as the flow of sulfite stock is changed, the flow of groundwood stock will be automatically changed in the same proportion, so as to maintain the set ratio between these two flows. In other words, the rate of

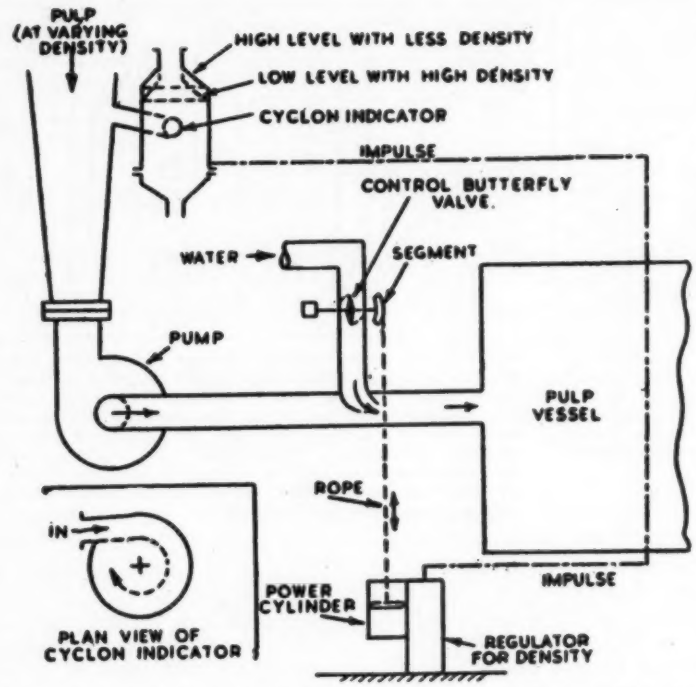


Fig. 4—Diagramatic layout of Kaelle density control as used in Swedish pulp and paper mills

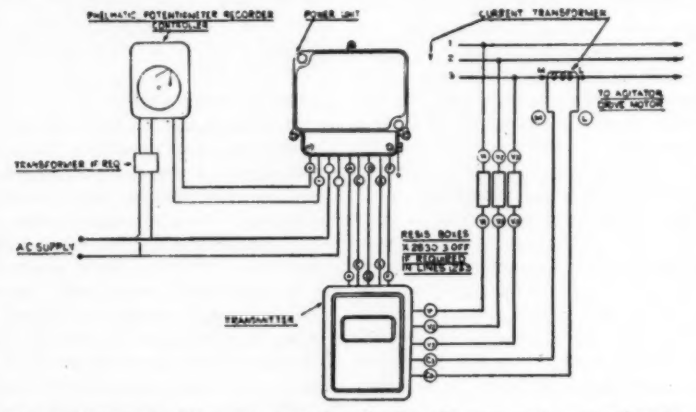


Fig. 5—Automatic blow pit control with Bristol's pneumatic potentiometer controller

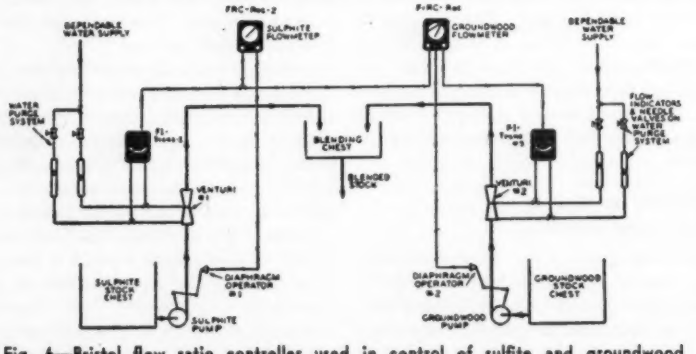


Fig. 6—Bristol flow ratio controller used in control of sulfite and groundwood stock blending

flow of groundwood stock is dependent on the rate of flow of sulfite stock.

The output air pressure from the sulfite stock flow transmitter FI-Trans-2 is connected to the groundwood flow ratio controller FrRc-Rec, as well as to the sulfite controller FRC-Rec-2. This air pressure actuates a ratio mechanism in the groundwood controller FrRc-Rec and also a second pen which records sulfite stock flow. This ratio mechanism automatically positions the set point of the groundwood controller so as to maintain groundwood flow in the desired ratio to sulfite flow. The ratio between flows can be manually adjusted to any value from 0.5:1, to 1.75:1 by turning a single knob in the groundwood ratio controller FrRc-Rec. An indicating scale in this controller shows what the set ratio is. A much greater variety of ratios can be obtained with this instrument by properly selecting the ranges of the two flowmeters. For example, a range of 0 to 200 gallons per minute on the sulfite flowmeter and 0 to 100 gallons per minute on the groundwood flowmeter will provide an actual flow ratio of 2:1 when the ratio scale in the ratio controller is adjusted to indicate 1:1. The ratio scale in the ratio controller can be graduated to show this ratio of the two actual flows, if so ordered.

This automatic stock blending control system provides the following advantages: (1) automatic control of each flow; (2) a chart record of each flow (additional instruments can be provided for totalizing each flow, if desired); (3) automatic control of ratio between the two flows; (4) total flow of blended stock changed by adjustments to a single knob, the desired ratio of blending being automatically maintained for all changes in total flow; (5) flow ratio changed by adjustments to a single knob in the ratio controller.

A change of ratio setting in FrRC-Rec will require adjustment to the set point knob in FRC-Rec-2, in order to maintain a given total flow. By having both sulfite stock flow and groundwood stock flow recorded on one chart FrRC-Rec, the actual flow ratio being produced can be conveniently calculated.

The same type of ratio control system can be extended to proportioning the addition of sizing, color, alum, etc., to the blended stock. In such cases, the small rate of flow of the added liquid requires a rota-meter-type flow transmitter. This flow transmitter is connected into the control system in the same manner as Venturi 2 and transmitter FI-Trans-3. The flow of the added size, color, etc., will be dependent on the flow of stock.

The author wishes to thank the instrument makers of the various control schemes shown for permission for their use.

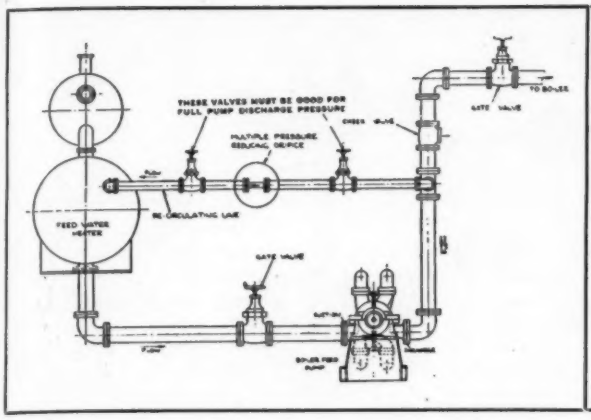


Fig. 1—Boiler feed pump by-pass arrangement, with operation regulated by either a manual or automatic valve

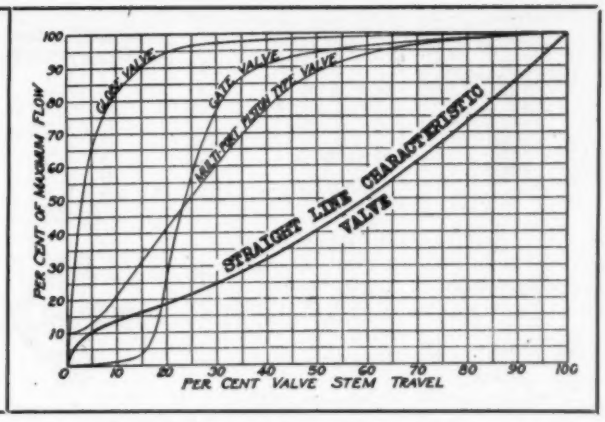


Fig. 2—Characteristics of flow curves for various types of valves (courtesy of Bailey Meter Co.)

Centrifugal Pumps

IGOR J. KARASSIK and ROY CARTER
Application Engineers, Worthington Corp.

Protective controls
Part 24 of a series

PROTECTIVE CONTROLS for centrifugal pump installations are usually extremely flexible and, with only minor modifications, can be made to serve most situations.

Protective controls are, by their very nature, automatic in their operation since they serve mainly to complement the operating personnel and perform functions which would normally be performed manually if the personnel were on hand. Likewise, the majority of these controls are intended to stop the pump and its driver whenever certain harmful operating conditions arise. A few operating controls, on the other hand, provide for some alteration in the operating conditions under the same circumstances.

Most of the reasons which might call for stopping a unit were discussed in an earlier article of this series. In general, the impulse for the operation of the protective control is selected from the conditions themselves which it is desired to avoid or eliminate. A rather typical case is a check valve to protect the centrifugal pump against damage caused by loss of water during operation. While the pump is discharging water, the check valve flap is raised and the switch is held closed. If for any reason the flow ceases (due to lack of water at the suction, for instance) the valve flap falls and opens the switch. The latter, being connected into the motor starter circuit, stops the pump automatically before any damage can occur to the pump from running dry.

Material from this article will be included in a book on centrifugal pumps now being prepared by the authors; hence, all rights to republication are reserved by the authors.

Check valves

Under certain conditions a centrifugal pump may be permitted to operate against a closed valve in its discharge; hence the simple check valve itself is, of course, a protective control device, for it prevents reverse flow through the pump whenever the pump-discharge pressure falls below the pressure in the header into which the pump is discharging. At the same time, a pump operating against shut-off may be damaged through overheating. Every check valve installation therefore must be checked to assure that shut-off operation cannot take place for any length of time. Wherever such danger exists, a bypass of some sort is provided, either manually or automatically operated.

Protection against loss of prime, provided by the check valve with switch described above, can also be incorporated into the motor starter itself. In such an arrangement, an inverse current relay is used to interrupt the electric circuit whenever the power consumption, and hence the current input to the motor, falls to say 50 per cent of the minimum value under any of the normal operating conditions. For instance, should the maximum brake-horsepower of the pump be 500 and the minimum (at shut-off) 280 hp, the inverse current relay would stop the pump if the power fell to 140 hp, indicating that the pump has lost its prime and is in imminent danger of running dry. A time relay must, of course, be incorporated in this control to permit operation of the pump when it is being started.

Motor controls

Various forms of motor controls which provide for protection against undervoltage, overload, frequency change and other motor conditions are not, strictly speaking, centrifugal pump controls. Motor overload may easily be caused by pump operation conditions. The most important consideration, however, in the application of motor protective controls is that the operator should know, whenever possible, that a motor has been stopped through the operation of one of these controls. This can be accomplished by the ringing of a bell or the lighting of a signal light.

In many cases, restarting of the driver and its pump upon the resumption of normal conditions is highly desirable, and the interrupting device is provided with re-establishment of current features. In other cases, however, where a pump must be primed manually prior to starting, the contactors must not be permitted to close again until the circuit is re-established manually.

Automatic operation of standby pumps

The majority of protective controls for starting standby pumps are based on pressure conditions in the main header.

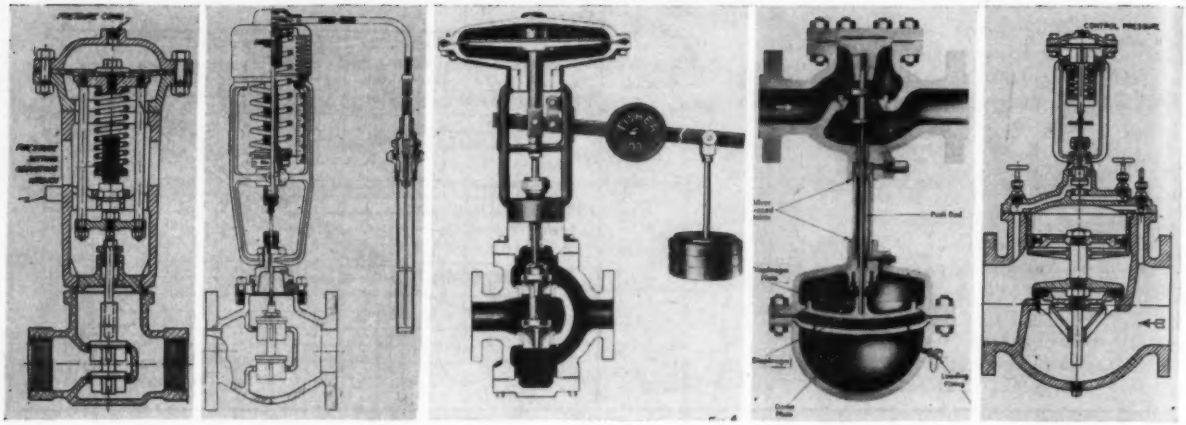


Fig. 3A—Pressure-reducing valve, spring-loaded (courtesy Ruggles-Klingemann Mfg. Co.); Fig. 3B—Thermostatically controlled regulator, direct-acting, spring-loaded (courtesy the American Schaeffer & Bundenberg Instrument Division of Manning, Maxwell & Moore Inc.); Fig. 4—Pressure-reducing valve, direct-acting, weight-loaded (courtesy Fisher Governor Co.); Fig. 5—Pressure-reducing valve, direct-acting, air-loaded (courtesy Foster Engineering Co.); Fig. 6—Internal pilot-operated regulator (courtesy The Swartwout Co.)

This header pressure is transmitted to one side of a spring-loaded diaphragm. The diaphragm-operated valve is held closed as long as the header pressure exceeds the predetermined minimum. If the header pressure falls below this value, the valve opens.

Whenever a standby unit is arranged for automatic starting through some control as described above, it must be held in condition to do so without any further manual operation. Both suction and discharge valves must be open at all times, the pump remaining protected against reverse flow by its check valve. All service lines, such as water cooling supply to the bearings or stuffing boxes must be open or, at least, arranged to open automatically upon the starting of the unit.

Why the boiler feed pump by-pass?

Boiler feed pumps are generally called upon to operate in a very wide load range, all the way from practically shut-off to full load. To protect the pump from the damage incidental to an excessive temperature rise, precaution must be taken to avoid operation of the pump at abnormally low flows. Inasmuch as the capacity of the boiler feed pump is solely governed by the feedwater regulator, which in turn is controlled by the main turbine load and the resulting rise or fall of the boiler level, some specific means must be applied to maintain a predetermined minimum flow through the boiler feed pump regardless of the turbine load.

This is achieved by installing a by-pass, located on the pump side of the discharge gate valve and check valve and leading to some region of lower pressure in the boiler feed cycle. The capacity of the by-pass is such that if the demand at the boiler falls to zero or if one of the valves becomes closed while the pump is running at full speed, the flow through the pump will not fall below the predetermined permissible minimum. This minimum is generally based on a maximum temperature rise of 15°F. This corresponds to approximately 30 gpm for every 100 bhp at shut-off conditions. The operation of the by-pass is then regulated by means of a valve, controlled either manually or automatically.

Generally an arrangement such as shown in Fig. 1 is used. Two valves are installed, one on each side of the orifice which controls the actual capacity in the by-pass. One of these valves remains always open and is closed only to isolate the orifice during inspection or renewal while the pump is in operation. The second valve is the control valve.

Arrangement of automatic by-pass

Automatic control of the by-pass involves some sort of actuating mechanism that will open and close the by-pass at the proper time. The actuating mechanism itself must be subjected to an impulse governed by the flow through the boiler feed pump, a great number of impulses being available for this purpose, as follows:

(1) Pressure drop across the feedwater regulator; (2) position of the feedwater regulator; (3) relief valve operated by the discharge pressure of the pump; (4) flow meter control in the suction or discharge line, and (5) thermostatic control.

From an evaluation of the respective advantages and disadvantages of these five sources of impulse, it appears that flow meter control is by far the safest and most reliable. The main disadvantages of the first two is that they afford no protection when several pumps are operated in parallel, discharging into a common header, in the event the check valve slams shut in the discharge line of any one of the boiler feed pumps.

As to the pressure relief valve control, it suffers mainly from the fact that the head-capacity curve of a high-head centrifugal pump is fairly flat at low capacities. Thus, a very slight change in the discharge pressure in that range may correspond to a major variation in the capacity of the pump, and the sensitivity of the control is very poor. This sensitivity would disappear completely if the characteristic curve of the boiler feed pump should have even a slight drop near shut-off.

The thermostatic control presents certain mechanical difficulties in that the thermocouple or thermometer (whichever may be used) must be introduced into the discharge of the boiler feed pump and is therefore subjected to the full discharge pressure. This imposes certain strength requirements which work to the detriment of greater sensitivity and introduces a greater time-lag, because the necessary reinforcement absorbs heat before the measuring element can register temperature change.

This time-lag factor in itself is nonexistent in the case of flow meter control.

Flow meter by-pass control

The actual operation of the flow meter control is quite simple. A flow meter element is located in the pump suction line. The meter operates two mercury switches. The contacts are so adjusted that the first contact completes the circuit on a decreasing flow but permits no by-pass until the second contact has been made at a still lower flow. This provides an overlap to prevent hunting, for the interval between the two contacts exceeds the amount of the by-pass flow, and the circuit is not broken until the total flow has increased to a value above the point of the first contact. The circuit is made to operate a solenoid valve admitting air pressure to the control diaphragm of the by-pass valve itself.

The circuit can be arranged so that the relay controlling the air loading pressure to the by-pass valve is de-energized at the low flow conditions, so that the by-pass would be operated in case of a failure of electric power to the contacts as well as at reduced flows. Similarly, since the by-pass valve is kept closed by air pressure, a failure of air pressure will also operate the by-pass, and the boiler feed pump is protected against damage under all conditions.

Of course, by-pass controls are not necessarily restricted to application in boiler feed pump installations, since they perform as important a function in any installation of centrifugal pumps where the system cycle is such as to introduce the possibility of operation at extremely reduced flows or against a completely closed discharge.

Other pump protective controls

The use of check valves in the pump discharge to prevent reverse flow in the pumping system has already been mentioned. The application of foot valves to pumps operating with a suction lift clearly belongs in the same class of protective pump controls, although it serves the additional duty of retaining water in the pump casing and thus allowing the pump to remain primed at all times.

However, ordinary check valves have the inherent characteristic of closing very quickly and therefore may give rise to excessive pressures in the system through the creation of water hammer. It is therefore desirable in certain cases to install slow closing power operated valves, such as cone valves or butterfly valves. These valves are generally hydraulically or even pneumatically operated, using either the hydraulic pressure in the pumping system itself or an external source of liquid or air under pressure for the source of power.

These protective controls can be applied not only to prevent reverse flow but also to protect the system against situations arising from the rupture of the pumping line, preventing loss of pumped fluid. This function is performed by making the valve control responsive to excessive velocities in one direction only or in either direction, depending on the particular features of the installation.

Another protective device used to stop reverse flow through a pump under certain conditions is the automatic syphon breaker. It may be applied to systems where the pump discharges into a syphon system and where power failure and the resulting stopping of the pump would be followed by the loss of water from the discharge reservoir through the syphon, unless the action of the latter was interrupted. The syphon breaker valve is located at the top of the syphon and maintained in a closed position by means of an energized solenoid. Power failure de-energizes the solenoid and opens the valve, admitting air into the system and breaking the syphon action.

Relief valves

There are a few pumping systems which may become subject to excessive pressures or even to water hammer under certain operating conditions. It is usual in such cases to provide protection both for the pumps and for the system in some form, such as air chambers, surge tanks or relief valves.

Relief valves may be used to protect certain separate portions of the system against pressures which may be suitable for the remainder of the system but excessive to that portion. One typical example of this application is the use of relief valves in the suction line of a pumping system provided with both check valve in the discharge and foot-valve in the suction. The latter is seldom suitable for the pressure which may exist in the discharge piping and may need protection against the possible failure or leakage past the discharge check valve.

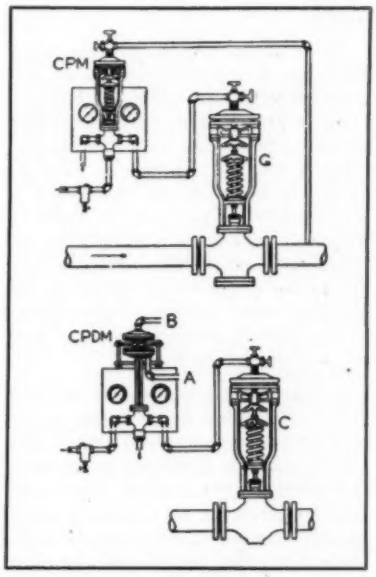


Fig. 7—External pilot-operated regulator (courtesy The Swartwout Co.)

The surge suppressor used in some discharge lines is a reverse form of relief valve or rather a relief valve which opens sufficiently in advance of the occurrence of excessive pressures to afford full protection against water hammer. This valve is arranged to open on an excessive *drop* in discharge pressure and close *very slowly* as the pressure is again built up. When the check valve in a discharge line closes suddenly, the excessive pressures caused by water hammer are preceded by a sudden drop in pressure immediately beyond the check valve. By the time the surge or rise in pressure takes place, the surge suppressor valve is fully open and ready to relieve the situation.

The foregoing is intended mainly as a presentation of typical examples, rather than a listing of all the possible control solutions which may act to protect either the pump, its driver or the system in which the pump is operated.

Technique of control application

Knowledge of the fundamental control functions, of the pump characteristics that these controls are intended to modify, of the component elements of controls and the understanding of some typical applications are not a sufficient guarantee of perfect handling of all control problems which may be encountered in the installation of centrifugal pump systems. There is needed, in addition, a certain familiarity with the technique of control application, a familiarity which can best be acquired through experience. This statement should not be construed, however, to mean that it is not practical to acquire some knowledge of this technique analytically.

Because the majority of pump controls are based on throttling either the main delivery stream itself or some part of this stream in a take-off branch, the greater portion of this discussion will be devoted to the application of throttling valves whether manually, automatically or semi-automatically controlled.

Proper measuring point affects accuracy

Accuracy can only be obtained if the variable to be controlled is measured at a point in the system where a true reading can be obtained. Such precautions may sound obvious but, unfortunately, pressure or flow measurements are often attempted at such locations where the reading is distorted. Measurements can also be distorted if the measuring element or the piping adjacent to it is allowed to become dirty, clogged, or incrusted. Thus, for instance, flow measurements by means of Venturi meter or orifice should be made at a point where the flow of liquid in the piping system has been properly straightened out.

Sensitivity is an attribute of corrective pump controls which is affected by valve size as much if not more than by the proper selection of the measuring element. The relation between the valve lift, the area of the opening and the resulting flow do play an important part in the successful application of valves.

If the valve size selected is too small for the range of capacities encountered, the friction losses will be higher than necessary and valve wear excessive. The penalty for undersized valves, therefore, is an unjustified increase in power consumption because of the increased total required head in the pumping system and in valve maintenance.

Valves can be too big

But just as a valve may be too small for its intended service, it may also be too large. Since the area of opening of a given valve must be made commensurate with the quantity of liquid that passes through the valve, the latter would be almost closed under most operating conditions. This may lead to wire-drawing and certainly to a decrease in sensitivity.

Consider, for instance, the case of the valves illustrated in Fig. 2. If a gate valve were to be selected considerably oversize, that is if the maximum flow in the system corresponded to approximately 50 per cent of the maximum permissible flow through the valve, then the valve stem would have to be held at approximately 23 per cent of its maximum travel. A reduction of 50 per cent in demand (or to 25 per cent of the maximum flow through the valve) would call for the movement of the valve stem to a position at 20 per cent of its travel, a reduction of only 3 per cent of the total travel from its former position, corresponding to a negligible angular displacement of the control wheel. Such a situation is even further magnified in the case of a globe valve and explains the reason for the unpopularity of the latter on throttling service.

It is obvious, therefore, that to fulfill the requirements of accurate and sensitive regulation throughout the full operating range of the controlled equipment, valve design should be preferably such as to give substantially equal increments of flow for equal increments of valve stem travel, regardless of whether the valve is near the closed or open position. Such a design, generally called a "straight line characteristic valve" and illustrated in Fig. 2, is available with a great number of valve manufacturers.

The disadvantages of valve oversizing do not, of course, apply to fixed, non-throttling valves used for on-or-off service. The only effect of oversizing in such a case is to reduce friction losses at the penalty of increasing initial costs to a point of diminishing returns.

Direct-acting regulators

Direct acting regulators are operated by the pressure of the system which it is desired to control. This pressure acts directly on one side of a diaphragm, bellows, or piston. The balancing force, which is set to a predetermined value, may be one or more springs, a weighted lever, or a preset air pressure. They are mainly applicable where the variable to be controlled is the pressure in the system, as direct acting controls cannot be made subject to capacity variation impulses. They can also be made to control temperature changes, as the latter can provide pressure variations in liquid or gas filled bulbs and connecting tubing.

Direct acting, spring-loaded (Figs. 3A and 3B)—Single or multiple spring loading may be used, depending on the range of the controlled pressure, on the maximum valve travel and on the total pressure load acting on the diaphragm bellows or piston. It is most favored for the majority of regulators because of its inherent compactness. Such regulators, however, cannot control pressures with extreme accuracy because of the variation in the compression of the loading springs between the full open and full closed positions of the valve.

Direct acting, weight loaded (Fig. 4)—This type of control is very sensitive to small pressure variations and avoids the shortcomings of spring loading in that the dead weight lacks the variation of compression inherent to springs. It is, however, limited to low pressure service because of the large weights required when pressures increase and of the resulting cumbersome construction of the control.

Direct acting, air loaded (Fig. 5)—The general characteristics of an airdome loaded control valve, as illustrated in Fig. 5, are the same as those of weight loaded controls, since a constant loading pressure may be maintained. Its main advantage resides in the elimination of impractically large and cumbersome weights and, therefore, permits its application to very wide pressure ranges. Unlike the weight loaded regulators, the airdome control requires frequent checks of the loading pressure and may need more frequent adjustments.

It goes without saying that all three sources of loading, that is spring, weight and air pressure, can be adjusted with relative ease, by tightening or loosening the springs in one case, by varying the dead weight in the second, and by pumping up or releasing some air from the dome in the last case. The first two may be adjusted while in operation, while the third generally cannot.

Pilot-operated controls

Pilot-operated controls are preferred where the forces involved in adjusting valve positioning may be excessive for direct acting controls. A control should have sufficient reserve power to handle emergency conditions such as sticking valves, etc.

Internal pilot operating regulators (Fig. 6)—Just as in the case of direct acting controls, internal pilot-operated regulators are only applicable to maintain pressure relations in a pumping system. The pilot is built into the main valve and is operated by the controlled pressure, while the main valve is actuated by the initial pressure upstream of the control. Such units are self-contained and compact, requiring no external operating pressure supply and are therefore unaffected by any possible failure of such supply.

External pilot-operated regulators (Fig. 7)—This type of control requires an external supply of auxiliary air, non-corrosive gas, water, oil or other liquid under pressure to actuate the main valve. The impulse from the controlled variable is transmitted to and operates the pilot which, in turn, varies the supply of auxiliary pressure to position the main valve. Such regulators are more accurate than direct operated types and more suitable to high pressure applications.

Information required by control manufacturer

It is necessary that when selecting or ordering centrifugal pump controls, the information furnished to the control manufacturer be as complete as possible. Some of the most essential data as to the contemplated installation are listed below:

1. Service or control function. What is it desired to accomplish?

2. Nature of fluid handled. Obviously, the character of the fluid will have an effect on the selection of the type and even, in some cases, of the size of the required valving. If the liquid is corrosive, indicate complete analysis. Likewise, if the viscosity of the liquid differs appreciably from that of water, indicate average or, at least, range of viscosities. Specify the temperature of the liquid and whether it is constant or variable.

3. Capacities of the flow being controlled, values of the initial and final pressures, if pressures are regulated. If steam flow to a turbine driving a centrifugal pump is to be controlled, full steam conditions must be indicated.

4. Character of the system operation. Is it constantly under load or is the operation intermittent?

5. Is the control to be manual or automatic? If the latter, which elements of the control must be automatic and which can be manually operated? Is remote control indicated or can it be self-contained?

6. Required accuracy of regulation.

7. Required range of adjustment.

8. Is dead-end service involved for the regulating valve, or is the flow continuous and small leakage permissible?

9. Should failure of control place the regulating valve into fully open or fully closed position? This question is especially important in the case of protective controls.

10. Structural details: position of valve (vertical or horizontal); type of connections for valve nozzles (if flanged, state desired facing and drilling).

11. For all of the above, indicate the full operating range of all variable factors, such as capacities, pressures and temperatures, including definite maximum and minimum values.

The role of wood in industry

CLARK C. HERITAGE
Technical Director
Wood Conversion Co.

THERE ARE THREE basic avenues of industrial wood consumption and use. These are in order of importance: (1) its use as a structural entity—wood-as-wood; (2) its use as fiber, and (3) its use as chemicals. Each of these fans out into hundreds of specific uses, actual and potential.

Wood, as a structural entity, derives its utility from a crystalline fiber framework laid down in overlapping fashion tightly welded together by the binder of the middle lamella. The fibers are aligned in the longitudinal direction, producing grain or a high degree of anisotropy. Nature thus provides a structure which resists rupture and deformation by external forces as imposed on the living tree. The growth processes require the constant transmission of aqueous solutions so the structure is porous, the void fraction being as high as 0.7 in many species. Thus, many of the structural attributes are little affected by the presence of water. The fibers as formed change their characteristics with the season of the year, as evidenced for example by the concentric rings of denser summer wood. The center of the tree gradually takes a lesser part in the growth and becomes heartwood. Further, there occur at irregular intervals abnormalities such as knots and pockets. This may all be descriptively summed up as extreme heterogeneity.

When it is considered that the farther we carry our forest crop utilization the greater is the variety of species, size and quality of logs produced, the complexity of the conversion to useful wood-as-wood is quite apparent.

Abridged from a paper presented at the Symposium on 100 Years of Engineering Progress with Wood held at Chicago September 12, 1952.

Lumber manufacture

The commodity of greatest importance is lumber. Manufacture of lumber entails mechanical perfection in the conversion of a roughly circular cross section to that of a rectangle, maintaining useful lengths and providing at the same time a quality segregation of material, uniform within grades. Achieving mechanical perfection is greatly complicated by the weight and irregularity of the logs, tons of wood and water being handled in one piece. A high degree of engineering and operating skill is involved in accomplishing the rapid subdivision of pieces of large mass—yet with dimensional precision so gaged that, after succeeding operations including drying and surfacing, dimensions will finally be within the tolerance the consumer requires. This progress is being made first by barking before breakdown, next by fast precise endless band head rigs and automatically positioned edging saws, next by the automatic control of the kilns, and finally by the machine tool precision of the planers. Striving for the highest grades and uniformity within grade begins with careful log grading, carries through the head rig where the first subdivision of the log is truly an art, and continues in the secondary breakdown of resawing and trimming, the pieces being recycled and regraded as dimensions are reduced until the highest, most uniform value possible is attained.

So-called stress grading and the National Design Specifications for Stress Grade Lumber and Its Fastenings, so widely used by the engineering profession, was made possible by engineering research and field testing through the cooperation of the Forest Products Laboratory and the National Lumber Manufacturers Association. It is a far cry from the scantling of our grandfathers to the stress grade lumber of today.

Uses of lumber

The statisticians tell us that in the lumber-using industries 75 per cent of the volume goes into construction. The remainder is divided in a 60:40 ratio between shipping uses and factory uses.

In the shipping category are found boxes, crates, cases, pallets and skids, grain doors, reels and dunnage. Some of these encounter little competition; others, as certain containers, are highly competitive, corrugated, veneer, and lumber boxes all from wood-using industries vying with each other. It is difficult to foretell the future of lumber use in this field since it was abnormally high in the war years. A new development is on the horizon which employs wood as veneer faced with kraft fiberboard, thereby combining the superiorities of each without carrying along their deficiencies. In any event, the wood-using industry appears to have no serious competition from outside.

The factory uses accounting for 10 per cent of total lumber volume are half for furniture. Although some inroads have been made by materials other than wood, wood use increased in this industry some 50 per cent in the last decade. There seems little chance that the general preference for high quality wood, born of long association, can be seriously disturbed.

Plywood is the next major wood-as-wood industry. Currently production is about 50 per cent softwood, chiefly Douglas fir, and 50 per cent hardwood of a variety of preferred species. As a decorative material and for specialty

uses plywood is old. Increase has been slow but steady for the hardwood variety.

However, in the case of softwood, a structural plywood was introduced about 1920 bonded with the protein glues of that period. In the middle 30's hot pressed resin bonded material appeared which under the excellent guidance of the Douglas Fir Plywood Association has developed into the high value exterior quality of today. Consumption in 1925 was 150 million square feet, today it is 2,700 million.

It is clear that in the future a wider variety of species will be employed, and the problem of maintaining high utility will be paramount as smaller and less perfect logs are employed.

The two remaining avenues of industrial wood use, namely fiber and chemicals, aside from their importance in their own contributions to the national economy, are peculiarly essential to reaching the objective of complete, stabilized, integrated utilization of the best tree crop we can grow. We must have more diversification. Wood-as-wood is by no means enough. We must have more large volume low cost primary products, and we must be able to use residuals of any size, shape or quality, be they defective trees in the forest or shavings in the planing mill. Fiber and chemicals have done part of the job and have the potential to do it all.

Apparently no wood fiber was produced in the United States 100 years ago, believe it or not. Groundwood appeared in the 60's, sulfite pulp in the 80's, kraft pulp shortly after the turn of the century, exploded fiber in the 20's, semichemical pulps in the 30's and whole wood fiber in the last decade. These now encompass all compositions from whole wood to pure cellulose. Converted products and their uses are multitudinous. Per capita consumption in 1900 was 60 pounds, presently is close to 400 pounds. A magnificent engineering job is being done.

Highlights of the last decade

The manufacture of whole wood fiber now approaches a million tons annually. It is converted to roofing felts, corrugating paper, insulation board and hard board.

A large increase has taken place in the use of high-yield semichemical pulps particularly adapted to consume deciduous species of low value, for both coarse and fine papers. Consumption has doubled in five years.

There has been a great expansion of the sulfate or kraft industry, not only unbleached kraft for shipping containers and bags but also bleached kraft for the paperboards consumed in the modern packaging of dairy products and frozen foods.

Waste liquor disposal problems have been solved in various ways, including methods of combustion for steam production with recycling of chemical reagents, and processing for by-product chemicals, such as ethyl alcohol and protein yeast from the sugars, vanillin, and moldable compositions from the lignin acids.

The perfection of a multitude of new paper uses has been accomplished.

There has been an expansion of the fiber board industry, both soft and hard, using residuals as raw material not previously utilized, and commercializing the felting of air borne whole wood fiber, without employing suspending water at any point in the process.

We have accomplished a union of fiber structures with resins to produce, by hot compression, both panels and contoured objects serving an area of the plastics industry requiring large volume low-cost materials.

The trends to much greater use of the high-yield fibers such as those consisting of whole wood, those produced by the mild semichemical techniques and unbleached kraft itself, are particularly favorable to our objectives by virtue of more complete utilization of the raw material and the suitability of forest and mill residuals.

Many engineering problems still unsolved

There remain basic engineering problems the solution of which would bring our objective closer.

The need is great for products consuming wood particles smaller in size than chips, such as hogged particles and sawdust. Currently, after drying, these are being compressed to fuels of special form as pres-to-logs and briquettes. Several companies are pioneering board products through resin bonding, but the markets for this type of product are already quite competitive.

The fixed capital required for pulp and paper making is high both per unit output and total, partly as least because pulping is largely a batchwise pressure process. Continuous pulping is now a commercial reality for the high-yield pulps. There are pulping reagents, effective at atmospheric pressure, but the economics are not yet favorable.

Present pulping processes are designed for pulp production only, the remainder of the raw material serving as fuel or going to disposal. When processes are designed to achieve complete utilization without resorting to fuel, pulp will be but one of a variety of income producing products. This is being approached in several plants by the combination of pulp, alcohol, vanillin, and plastic lignin production.

Chemical products from wood are fascinating to talk about, tough to commercialize, and attractive to try because these will be the utilization scavenger so badly needed. The chemical heterogeneity of wood is no less than its physical counterpart. A skeleton of cellulose fibers is imbedded and bonded in a matrix of lignin accompanied by an aggregation of other organic compounds neither cellulose nor lignin.

Chemical products

The chemical processing avenues open are in general extraction, cleavage, and fractionation. One and a half million tons of pine stumps are extracted annually for naval stores, now forming the basis for a separate chemical industry. The extracted residue is used for fuel. Cleavage is exemplified by the sulfite pulping process whereby almost a million tons of chemical cellulose is produced annually for textiles, films, lacquers, explosives, and plastic derivatives. There is also pyrolysis or wood distillation—now on the way out because too much of the raw material goes to products of too little value, such as charcoal and fixed gas. There is some hope of revitalizing this avenue through the application of the chemical engineers' modern fluidized bed techniques. Another case of cleavage is acid hydrolysis to yield glucose molasses, hence a variety of fermentation products, together with a specific type of lignin. Attempts to commercialize go back 50 years, the latest being the government-owned plant at Springfield, Ore., not yet commercially proven because the development of lignin uses is unfinished. The molasses must compete with imported blackstrap, the alcohol therefrom must compete with the direct synthesis from refinery gases. Hence lignin must furnish part of the earnings. Chemical fractionation of the wood constituents with minimum of chemical change has not progressed beyond pilot plant stage.

The problem of chemical use centers in the necessity for conversion of all the raw material to valuable products in order to comply with sound economics, which at once calls for markets for lignin or its chemical conversion. A number of companies have entered the by-product lignin business during the last decade no doubt with some measure of success. The desired large volume low cost uses remain to be, and will be, developed. There is no dearth of activity nor of enthusiasm for this No. 1 problem of chemicals from wood. Special mention is well deserved by both public and industry groups, such as the U.S. Forest Products Laboratory, the Oregon Forest Products Laboratory, the Institute of Paper Chemistry, the Wood Products and Wood Chemistry Laboratory of Timber Engineering Co., the Western Pine Association Laboratory and the Sulfite Pulp Mill Research League.

Job evaluation . .

–building the wage and salary structure

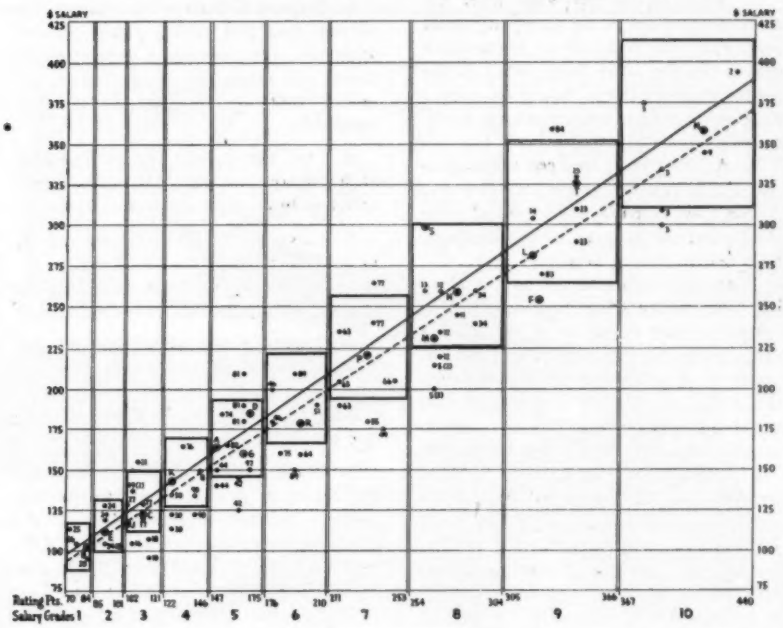
J. A. KELLER*

Part 5 of a series

The next article, which will appear in a forthcoming issue, will cover the use and maintenance of job evaluation through effective wage and salary administration procedures

XYZ CORPORATION

Correlation of Salary Rates and Salary Grades for Clerical, Sales, and Supervisory Employees



NOTES

- Each dot represents a job and is placed to show both the present monthly salary paid the employee and the point value of the job. The numbers adjoining the dots are job numbers; where there is more than one employee on the same job at the same rate, this is indicated by the number in parenthesis.

  Example: • 24(2) indicates 2 employees are on job number 24 at the same present salary rate.

- ● The circled dots represent jobs for which area rates have been obtained. The position of ● on the chart indicates the average monthly salary paid in the area and the point value of the comparable job at XYZ. The letter adjoining ● identifies the job.

The diagonal solid line reflects the proposed XYZ salary curve.

The broken line reflects the area salary curve.

The boxes represent the salary range and point range for each salary group.

Salary Group	Point Value LOW	Point Value HIGH	Salary Range MIN.	Salary Range MAX.
1	70	84	$ 88	$116
2	85	101	99	132
3	102	121	112	150
4	122	146	128	170
5	147	175	146	194
6	176	210	167	223
7	211	253	194	258
8	254	304	226	301
9	305	366	265	353
10	367	440	311	414

IN PRECEDING ARTICLES we have described the steps which must be taken in developing and carrying out a company job evaluation program.

When these steps are completed and there is a clear, fair system which shows the relationship between jobs in terms of responsibility, difficulty, and job requirements, management is ready for the next important phase — building the wage and salary structure.

Job evaluation is a measuring stick which shows the relative worth of the jobs in the organization. These relationships, to be of real value to the company and to be fair to the employees involved, must be applied with objectivity and sound judgment in setting up the wage and salary plan.

The wage and salary plan must be geared to three factors:

1. The proper relationship between company and area rates.
2. The salary level best suited to the needs and means of the company.
3. The proper relationships between jobs in the company.

As Whitehead, Roethlisberger and other students of industrial psychology have pointed out and as most people in operating management can testify, the worker's attitude toward his rate of pay is more significant, for many purposes, than the real income it provides. The first and second factors above have basic importance in forming the worker's attitude.

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Rate comparisons

Comparisons are important to the worker. They establish the dividing line between a "square deal" and a "raw deal." He knows he cannot earn all he would like, but he wants what is coming to him. Through informal contact, workers from a number of plants in an area soon ascertain the going rate for specific jobs. Therefore it is necessary that management also knows the area rates.

As labor market competition has grown keen since World War II, sources for learning area rates have been developed. The Bureau of Labor Statistics provides a variety of comparative data on area, industry, and occupational rates.

While these figures are applicable primarily to the larger metropolitan regions, they offer some guide to rates in surrounding communities. The National Industrial Conference Board also publishes wage survey data from time to time. Larger companies which employ a regular wage survey staff print excellent surveys which are sometimes available on request.

After the general level of wages has been ascertained, it is important to learn what your primary competitors in the labor market are paying. In many instances informal contact between the plant personnel organizations in one area or industry can provide comparative wage data. Employers, industrial relations, and trade organizations have provided means for exchanging information on wage rates as well as other personnel policies and practices.

Questions for management

The salary level best suited to the needs and the means of the company is the most important decision of all in building a good salary structure. The following questions must be answered by management after careful consideration of the specific situation involved.

1. With what companies or industries are we in direct competition for labor?
2. What caliber of help do we actually need for satisfactory operation of our business?
3. What caliber of help would we prefer to hire?
4. How tight is the labor market in which we are competing?

5. To what extent will unions in our plant or surrounding plants influence our wage level decision?

6. What is the top wage level the economic position of the Company could bear and still produce at competitive prices. On the other hand, what is the lowest wage level that could be offered to be equitable and attract enough workers to man the plant?

7. At what level between the highest and the lowest wage level we *can* pay do we *want* to pay? Do we want to be the leader, the average, or the company with below-average wages?

These decisions add up to a "salary line." In formulating the salary line, a company must be aware of the morale factors that the salary level will tend to produce. A salary line that is set below the average is usually uneconomical in the long run because of the above-average costs which may result from

(1) above-average turnover; (2) defective work or subnormal production produced by available help; (3) extra inspection to insure satisfactory product quality; (4) additional training to get satisfactory workers, and (5) frequent or prolonged labor disputes.

With all the current emphasis on employee benefits and non-financial incentives, the fact remains that the *take home pay* is the most *tangible* and most *comparable figure* that a worker uses for comparison with other workers.

Proper relationships

The third factor to which the wage and salary plan must be geared is the proper relationships between jobs in the company. More responsible jobs should be paid rates sufficiently above less responsible ones to provide strong incentives to employees. Individual grievances over wage and salary matters arise more often over comparisons between rates for different jobs than they do over the dollar and cents figure involved.

To facilitate the administration of the wage program, salary grades may be set up. In determining the actual grade ranges it is important to remember that:

1. Each salary grade should have a sufficient range to provide for flexibility and progress of the workers covered.

2. Each salary grade level should overlap the grade above and below it.

3. The mid-point of each grade level should be that salary at which the normal employee will have completed normal job training and will be performing the work assigned in a satisfactory manner.

Charting the course

A graphic "correlation chart" as illustrated on the preceding page is of great advantage in showing the steps and decisions involved in setting up the salary grades.

A "correlation chart" establishing grade levels and ranges is prepared in the following manner:

1. Prepare a chart with salary rates on one axis and rating points on the other axis. Use convenient units of equal size to plot salary rates (e.g., 5 cents per hour, $2.00 per week, $25.00 per month).

2. Plot the present salary rate for each job against the total point values assigned to all the factors in the jobs.

3. Calculate the present salary curve, or graphic relationship of salaries to responsibilities, by the statistical method of "least squares."

4. Select the number of grade levels by analysis of the number of natural clusters of jobs and the approximate number of grade levels appropriate to the situation.

5. Statistically determine and plot the point ranges for each grade so that the ranges increase geometrically as the grades progress toward the more difficult and higher rated jobs. This geometric increase is provided because jobs at the higher end of the salary scale cover a wider range of difficulty and responsibility than do those at the lower end of the scale.

6. Determine and plot salary ranges by setting a maximum and a minimum rate (often 15 per cent) above and below the intersection of the salary curve and the mid-point of each point range.

7. Plot salary rates and evaluated point scorings of representative jobs for which area rates have been obtained.

8. Calculate the area salary curve by the statistical method of least squares.

The effectiveness of the wage program depends to some extent upon the employees both understanding and accepting the program. As a corollary to a systematic wage program, it is necessary to follow a sound program of promotion and merit wage increases. Without such a comprehensive and unified approach, workers are liable to resent the whole wage program as being too mechanical and impersonal.

With many similar jobs, companies in the paper products industry are in an excellent position to realize the benefits of a job evaluation program providing both (a) impartial and systematic standards of wage payments and (b) one of the requisites for a sounder industrial relations program.

Note from a reader

Gentlemen:

In your issue of January 1953, p. 1244, you stated under Odd Bits that, "The mediaeval Persian word for paper—KAGHAD—adopted by the Arabs, derived from KAGH, meaning 'noise'—referring probably to the racket made by paper mill hammers or stampers."

This statement does not hold; the matter is, of course, somewhat different. *The word "Kaghad" is of Chinese origin,* just as the art of papermaking is.

As early as 105 A. D. the Chinese word for paper, in general, was "dz" (1). This word took different prefixes according to the various kinds of uses, viz. the special qualities of paper. So the most common quality, also produced in uppermost quantities, writing paper, was *"kog dz"* (1).

This word the Japanese adopted, when in the 7th century they, through Korean priests, got acquainted with the secret of papermaking and changed it, with time, into *"kodzu"* (2), what has till today been the name of a given kind of Japanese paper and, especially, of the raw material this paper is made from.

On the other hand, the Arabs, after the battle on the Tarras river, learned from Chinese prisoners, captured in this battle, the secret of the art of papermaking. They, too, adopted, together with the handicraft, the Chinese name for paper. This was proved by an Austrian scientist, *Hirth* (3), who found evidence in an ancient Bucharo-Chinese dictionary that the Chinese word "kogh dz" was used in Bucharia and Persia as *"kagbiz;"* this word the Arabs adopted and changed it into *"k'ghid,"* viz. *"k'ghad."*

I am, Gentlemen, yours very sincerely,

March 16, 1953

(Signed)

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Kralja Milutina 25, Belgrade, Yugoslavia.

(1) Pap.-Fabr.—W. f. P. *1943*, 99.
(2) Handb. d. Papier- u. Pappenfabr. Leipzig 1939, 798 & 941.
(3) *Karabacek*, J., Papyrus Erzherzog Rainer. Fuhrer durch die Ausstellung. Wien 1844, XX.

Editor's Note: The source of the material appearing in Odd Bits in the January 1953 "Paper Sketches" was "Paper Making by Hand" by R. H. Clapperton, page 84.

PAPER SKETCHES

IN THE LATE 1790's strips of brown paper were used by English tailors to take measurements, the inch tape not being in use at that time.

TO INCREASE the POWER of line-shaft pulleys many factory owners of the late 1800's covered them with manila paper which was applied by first heating the pulley, applying glue, then lapping on six strips of paper one atop the other.

ONE of the FIRST electric light filaments used by Edison was a charred strip of paper which, when mounted in a glass vessel from which the air had been exhausted, burned about eight minutes.

Odd Bits

"THE TALLAHASSEE DEMOCRAT" for Sat., Mar. 28, 1953, is said to have been printed on "CELSEDGE," a new type of newsprint made from Florida sawgrass that had been tried and found successful on experimental runs staged by the Herty Foundation Laboratory.

HAM FELTZ says:

"Every Salesman likes to take orders"

One reason why salesmen are so anxious to send orders to their home offices is to prove to the boss that they are "on the job." But the boss knows that the real value of field men depends upon the regularity with which repeat orders continue to flow in direct from the customers.

Only a small portion of orders for Hamilton Felts come from Hamilton salesmen. Mill superintendents don't have to be resold on Hamilton Felts after the first tests. They know by experience that there is one particular style of Hamilton Felt among the 300 different weaves that does a certain job better, faster and at lower cost.

The greatest service our salesman can render is to give you the benefit of his long experience with other superintendents whose problems are much like yours.

Hamilton Felts

MIAMI WOOLEN MILLS

Established 1858

SHULER & BENNINGHOFEN, HAMILTON, OHIO

The Paper Industry Association News

Buyer's Viewpoint Stressed at Chicago Tappi Meeting

The need for systematized quality control made possible through cooperation between the carton supplier and the user was emphasized at the April meeting of the Chicago Section of Tappi by E. H. Balkema, general purchasing agent for Colgate-Palmolive-Peet Co. It is necessary, he declared, to establish standards on a national level.

The speaker defined quality control in dictionary terms, since "the term means many different things to different people." However, no matter what the understanding of the term, he pointed out that without complete specifications given by the buyer to the supplier, the best control system is useless.

Mr. Balkema suggested that the producers of packaging through their associations promote the idea of complete specifications for all users of the same type of package. No matter what the system, he continued, the following results are obtained by a successful plan: (1) the desired quality of packaging materials; (2) low net cost; (3) low waste factor; (4) minimum down time caused by poor quality materials, and (5) minimum cost and maximum efficiency.

Buyer quality control, Mr. Balkema concluded, can show up supplier defects. A few of such defects uncovered by Colgate include: make-ready sheets made into cartons, wrong color inks, incomplete flap die-cutting, side seams not glued completely, too much glue, weak back liner causing carton splitting, and off caliper and weight board. The system employed by Colgate shows up about 90 per cent of the mistakes involved. When these errors are detected, the firm calls for the suppliers' quality control charts, which are used as guides to determine if the material should be accepted.

Ohio Tappi Members Tour Bauer Bros.

Members of the Ohio Section of Tappi toured the plant of The Bauer Bros. Co. in Springfield early in April. More than 130 observed manufacturing operations in connection with the building of pulp refineries, double and single revolving disc attrition mills, bark removers, and Centri-Cleaners.

Included on the tour was a visit to the Fiber Products Laboratory at the Bauer plant. This organization is maintained to serve manufacturers of groundwood, chemical pulps, semichemical pulps, paper, and board. It boasts commercial-size equipment and is designed to bridge the gap between miniature experimentation and commercial scale operation. The laboratory is sponsored jointly by Bauer, Briggs Boiler Works Co., Coe Mfg. Co., Downingtown Mfg. Co., Oliver United Filters, Inc., and United States Wall Board Machinery Co. Inc. and is available for private researches.

Following the plant tour, the Ohio Tappimen were guests of Crowell Collier Co. for lunch in the company cafeteria, after which they made an inspection trip through the printing, binding, and rotogravure sections of the plant. An address on the development of the gravure printing processes, presented by Allen C. Black, superintendent of the gravure preparatory department, concluded the program.

200 Attend CPPA Technical Meeting on West Coast

Approximately 200 delegates attended the annual spring meeting of the Pacific Coast Branch Technical Section of the CPPA at Harison Hot Springs, B. C., March 26-28. Chairman of the gathering was M. F. Smith, technical director for Sidney Roofing & Paper Co., Victoria.

Speakers included J. W. Hill, groundwood superintendent for Elk Falls Co. Ltd.; Gleb Goumeniuk, West Vancouver industrial and research consultant; D. D. Hall, The E. B. Eddy Co. Ltd.; W. A. Dale, Alaska Pine & Cellulose Ltd., and J. L. Godding, Pacific Mills Ltd. Current research activities in wood fibers at the University of British Columbia was the subject of addresses by R. W. Wellwood and J. W. Wilson of the university staff. W. F. Holzer, assistant to the vice president in charge of manufacturing for Crown Zellerbach Corp., discussed the European pulp and paper industry.

CPPA's Western Division Elects 1953-54 Officers

J. A. Craig, general manager for Sidney Roofing & Paper Co. of Victoria, B. C., has been elected chairman of the Western Division of CPPA.

Members of the new executive committee are: Leslie Cleminson, general manager of the Cellulose Division of Alaska Pine & Cellulose Ltd.; J. G. Prentice, president of Canadian Forest Products Ltd.; W. C. R. Jones, mill manager of Columbia Cellulose Ltd.; H. J. Mackin, president of Elk Falls Co. Ltd.; L. L. G. Bentley, president of Howe Sound Pulp Co. Ltd.; B. M. Hoffmeister, president of MacMillan & Bloedel Ltd.; J. S. Johannson, general manager of public relations for MacMillan & Bloedel; W. J. Van Dusen, vice chairman of the board of MacMillan & Bloedel; Paul E. Cooper, president of Pacific Mills Ltd.; H. S. Foley, president of Powell River Co. Ltd.; H. J. Foley, executive vice president of Powell River; E. M. Herb, president of Westminster Paper Co. Ltd., and F. F. Foote, secretary-treasurer of Westminster.

Magazine Needs Explained at Empire State Tappi

Properties important to obtaining good printing at high speeds were emphasized at a recent meeting of the Metropolitan District section of Empire State Tappi. The gathering was at Fraunces Tavern in New York, N. Y.

Although a sheet apparently meets all specifications, according to F. D. Lincoln Jr. of Time Inc., trouble can still be encountered from wrinkles in the paper, or from telescoping rolls or other defects not apparent before unwinding. Speaking on the experiences of *Life* magazine, he declared that seven manufacturers furnish paper for *Life*, and although the sheets vary in composition, they all must pass rigid specifications in end use in relation to mechanical performance and printability. Running at high speeds with temperatures of up to 350°F. in the drying section, he said, the paper is always under terrific tension. One of the best tests to measure the overall mechanical performance, according to Time and Life researchers, is the Elmendorf dry tear test.

The moisture present in the paper is another important factor, Mr. Lincoln continued. Excess moisture can cause blistering at high temperatures. Then again, one of the big troubles in high-speed printing is web breaks. These may be due to fiber cuts, calender cuts, slime spots, or any number of defects. A web break requires approximately 20 minutes

to repair, and at present in printing *Life* there are about two hours downtime per 100 rolls of paper. Work is constantly underway to reduce this figure.

According to Mr. Lincoln, *Life's* five important requirements for good printing are levelness, smoothness, compressability, resiliency, and ink receptivity. He discussed the importance of each factor. Gloss itself is not an important factor, he explained, but only insofar as it is related to smoothness. A sheet with lower gloss may have better smoothness than a high gloss sheet. Other important factors, he concluded, are pick, opacity, and brightness. Once the standards for quality have been set, uniformity is most important. It is much better to have a sheet of uniform average quality than to have one that jumps from average to high quality and back to average.

Problems of the printer

Second speaker on the program was E. V. Morris of Henry Lindenmeyer & Sons, New York, N. Y., who spoke on the topic, "The Job Determines the Paper." Mr. Morris described some of the problems with which the printer is faced. He has to handle a wide variety of papers—from glassine to blotting.

Selling the right paper for the job is the paper merchant's first duty, the speaker continued. To sell any paper but the right paper is a disservice to the customer. End use is always of prime importance and cost a definite consideration. Mr. Morris declared that it is often of great importance for a printer to advise the paper merchant of the exact end use to which a paper is to be put. In one case an entire order was ruined because the merchant was not advised that the sheet was to be varnished.

Various types of papers have basis weights based on different dimensions, the speaker concluded, but by converting to equivalent basis weight it is often possible to interchange grades. The paper merchant must be fully aware of the possibilities of substitution.

About 70 members and guests were present at the meeting. C. G. Landes was program chairman.

Connecticut Valley Division of the Superintendents Association has presented a life membership certificate in the national association to Charles H. Kent, special representative for Hercules Powder Co. Inc.

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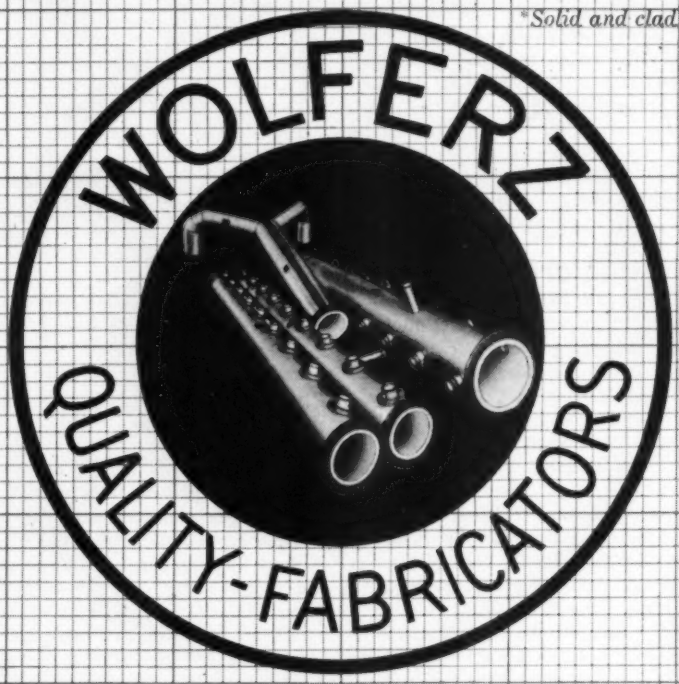

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Coming Events

TAPPI meetings

June 15-26—Statistical Methods Conference, Western Michigan College, Kalamazoo

June 19-20—New England and Maine-New Hampshire Sections, joint meeting, Poland Spring House, Poland Spring, Maine

Oct. 26-29—Engineering Division, Sheraton-Mount Royal Hotel, Montreal

Nov. 18-20—Seventh Alkali Pulping Conference, Rice Hotel, Houston, Texas

American Pulp & Paper Mill Superintendents Association Meetings

Sept. 11-12 — Northwestern Division, Hotel Wausau, Wausau, Wis.

Sept. 17-19—New York-Canadian Division, The Alpine Inn, St. Marguerite, Que.

Sept. 17-19 — Northeastern Division, Poland Spring House, Poland Spring, Maine

Oct. 23-24—Pennsylvania-New Jersey-Delaware Division, Pocono Manor, Pocono Manor, Pa.

Oct. 28-30—Southern and Southeastern divisions (joint meeting), Edgewater Gulf Hotel, Edgewater Park, Miss.

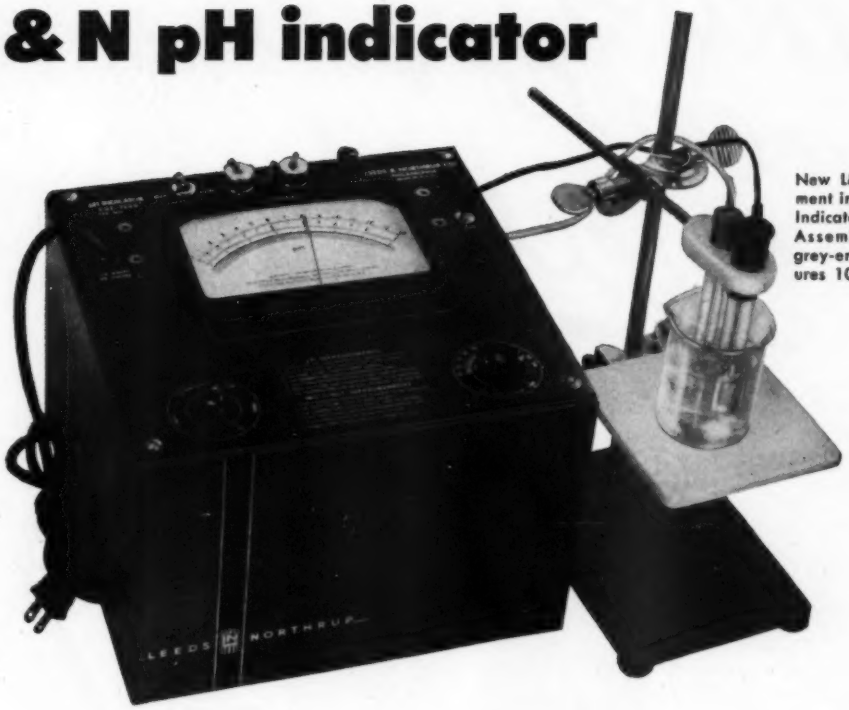
Other meetings

Sept. 13-16—The Electrochemical Society, Ocean Terrace Hotel, Wrightsville Beach, N. C.

Oct. 27 — Association of Consulting Chemists and Chemical Engineers, Hotel Belmont Plaza, New York, N. Y.

Stabilized

L&N pH indicator



New L&N pH Indicator. Equipment includes: line-operated pH Indicator and Electrode Holder Assembly. Indicator case, of grey-enameled aluminum, measures 10½" x 10¼" x 8¾".

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• readable to within ±0.02 pH

This *converter-type* pH Indicator offers remarkable stability. Embodying important refinements in circuit design, it is unaffected by normal fluctuations in line voltage . . . or by zero drift of the amplifier.

In lab or plant—you'll appreciate the many advantages of this new instrument. The few required adjustments are simple to make. Single, *continuous* pH 0 to 14 scale eliminates range changing . . . a big help when you're working near pH 7. And you can read to within ±0.02 pH . . . on either grounded or ungrounded solutions.

Key to stability: the Indicator incorporates the high quality shielded *converter* developed for our Speedomax electronic recorders. Its circuit employs d.c. to a.c. conversion, a.c. amplification, and conversion back to d.c. for voltage feedback. Conversion stabilizes zero. Feedback stabilizes gain.

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Check these distinctive L&N advantages...

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- ✓ **Grounded or ungrounded solutions**—can be checked with equal ease and accuracy.
- ✓ **Only 2 controls, 1 switch**—standardization and temperature-millivolt controls . . . zero switch.
- ✓ **4 voltage ranges**—0 to +700, 0 to −700, 0 to +1400, and 0 to −1400 mv . . . for redox work and Karl Fischer Titration measurements.
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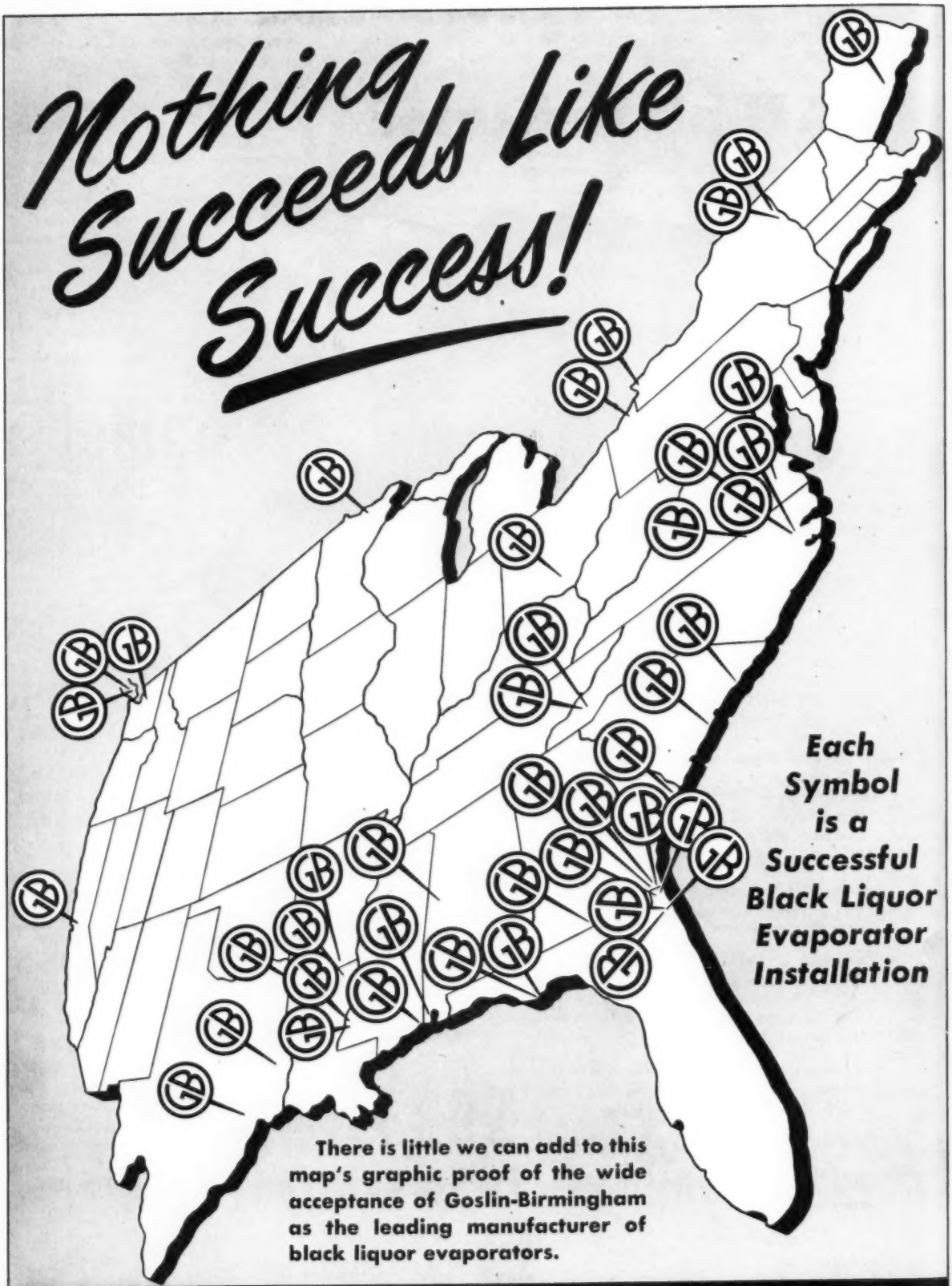

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The Paper Industry Names in the News

Dr. O. F. Behrend

J. H. DeVitt

Behrend Retires as Hammermill Treasurer

DR. OTTO F. BEHREND, co-founder and treasurer of Hammermill Paper Co., Erie, Pa., has retired. He is being succeeded by *JOHN H. DeVITT.*

Born in Germany, Dr. Behrend was familiar with papermaking from his boyhood, his father having operated a mill in the Province of Pomerania. After receiving his Ph. D. degree from the University of Berlin, he came to America in 1898. It was in that year that Dr. Behrend and his brother, the late Ernest R. Behrend, founded Hammermill.

Dr. Behrend was treasurer of the firm from that time until his recent retirement. During the early years of the company he also served as vice president, secretary, and entire laboratory staff. In the latter capacity he pioneered in the laboratory testing and manufacturing control of pulp and paper.

Mr. DeVitt, elected by the Hammermill board of directors to succeed Dr. Behrend as treasurer of the firm, has been a member of the organization since 1922. Entering the Hammermill auditing department in 1927, he was appointed assistant auditor in 1932, director of the budget in 1941, controller in 1944, and assistant treasurer in 1948.

Ross Made Vice President of International

ARTHUR L. ROSS, assistant general manager of the Southern Kraft Division, has been elected a vice president of International Paper Co. A veteran of 28 years with the company, he was made assistant general manager of the division last August after having served since 1939 as production manager of International's nine integrated pulp and paper mills in the South.

Mr. Ross entered the paper industry in 1925 when he became associated with the late R. J. Cullen as chief chemist at the Bastrop, La., mill. He served as pulp mill superintendent of the Bastrop and Louisiana mills and later as general superintendent of both mills. He was made general superintendent of the Georgetown mill in 1938 before moving to division headquarters in Mobile in 1939 as production manager. Mr. Ross will continue as assistant general manager of the Southern Kraft Division.

A. L. Ross

S. L. de Carteret

Canadian International Names de Carteret Board Chairman

Directors of Canadian International Paper Co. have approved a by-law providing for the creation of the office of chairman of the board. Elected to fill the post was *S. L. de CARTERET,* heretofore president of the firm.

Succeeding Mr. de Carteret as president is *VERNON E. JOHNSON,* formerly vice president and general manager. *FRED L. ALLEN,* formerly vice president and manager of manufacturing, succeeds Mr. Johnson as vice president and general manager. *PHILIP A. SARGENT* and *J. P. MONGE* were appointed vice presidents, the latter continuing also in his present office as treasurer.

Mr. de Carteret, who has been president for seven years, joined Canadian International in 1938. He has been identified with the pulp and paper industry in Canada for 45 years. During World War II he served from 1941 to 1944 as deputy minister in the Department of National Defense for Air.

Consolidated Promotes Two

Promotion of two men in the Technical Department has been announced by Consolidated Water Power & Paper Co. at Wisconsin Rapids, Wis. *S. R. PARSONS,* chief chemist, has been made research supervisor, while *GARY W. JONES,* mill chemist at the Whiting mill, has been named technical supervisor of the Wisconsin Rapids Division.

A graduate of the University of Maine and of the Institute of Paper Chemistry, Mr. Parsons joined Consolidated as a chemist in 1941. After more than three years in military service during World War II, he rejoined the firm in 1946 as chief chemist.

Mr. Jones, also a World War II veteran, took his undergraduate work at Oberlin College in Oberlin, Ohio, and received his Ph. D. in 1948 at the Institute. He started his career with Consolidated at the Wisconsin River Division in 1948.

HUGH A. BLACK has been appointed director of industrial relations for the Mead Corp. A native of Kingston, Ohio, Mr. Black has been with the firm since 1946. He will serve under Andrew J. Miller Jr., vice president for industrial relations.

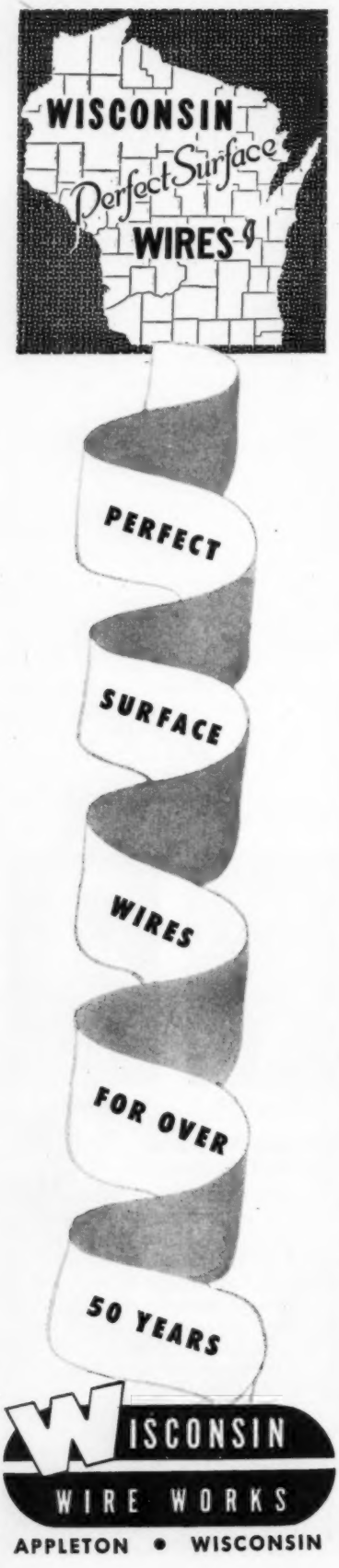
H. A. Black

Max Ackerman

National Container Appoints Treasurer

Election of *MAX ACKERMAN* as treasurer of National Container Corp. has been announced by Samuel Kipnis, president. He succeeds Harry Ginsberg, who will now confine his activities to his duties as chairman of the board of directors.

In organizational changes at the National Container mill in Big Island, Va., *O. B. WATSON JR.,* formerly with American Viscose Corp., has been named assistant office manager and purchasing agent. *GEORGE F. KERBY,* a graduate of Virginia Polytechnic Institute, has been appointed to the mill's staff of chemists. *JOHN H. SYMES,* formerly with Piedmont Paper Products



Co., American Coating Mills and the Champion Paper & Fibre Co., has accepted the position as assistant to the chief chemist. *WILLIAM W. HOOD*, formerly associated with Union Bag & Paper Corp., Brunswick Pulp & Paper Co. and West Virginia Pulp & Paper Co., has been named wood procurement supervisor.

K-C Official to Attend Swedish Conference

WALTER H. SWANSON, assistant vice president and director of research and development for Kimberly-Clark Corp., will attend the International Congress of Pure and Applied Chemistry at Stockholm July 29-August 7. An outstanding pulp technologist, Mr. Swanson will attend the physical chemistry section and the symposium on the chemistry of wood and wood constituents, at which one of the speakers will be Dean H. F. Lewis of the Institute of Paper Chemistry.

Mr. Swanson will visit several Scandinavian pulp mills, among which will be Stora Kopparbergs Atiebolga, where he will see modern sodium sulfite operation and an up-to-date chlorine dioxide manufacturing process and the application of chlorine dioxide in bleaching for very high-brightness pulp. He also plans a visit to Mo Domsjo, where he will tour the plants of such firms as Swedish Cellulose Co., Korsnes Co., and Uddeholms Pulp Mfg. Co.

A past president of Tappi, Mr. Swanson is a member of the American Institute of Chemical Engineers and one of the founders of the Forest Products Research Society, as well as a member of the American Chemical Society.

Hendrix Leaves Herty Foundation; Joins Valentine

W. L. HENDRIX, veteran official of the Herty Foundation Laboratory at Savannah, Ga., has resigned effective June 1. He will become superintendent of the bagasse paper mill being constructed at Lockport, La., by Valentine Pulp & Paper Co.

The Lockport mill will turn out newsprint and other papers from sugar cane fiber and is the outgrowth of research undertaken by Herty. Initial capacity will be approximately 17,250 tons of paper and dissolved pulp annually.

Mr. Hendrix, who joined the staff at the Foundation in 1933, was one of the workers with the late Dr. Charles H. Herty in the original project to produce newsprint from southern pine. He was at one time director of the laboratory but more recently held the title of production director, being concerned with test runs on the pilot paper machine.

In another change at Herty, *GEORGE KEMP* of Chattanooga, Tenn., has been named superintendent. A chemical engineer, he is a graduate of the Georgia Institute of Technology and was recently released from the U. S. Air Force, where he served as an electronics expert.

THERON T. "Tex" COLLINS JR. has been appointed technical director of National Container Corp. A veteran researcher in the pulp and paper industry, Mr. Collins obtained a master's degree at the Institute of Paper Chemistry, Appleton, Wis.

T. T. Collins Jr.

Cola G. Parker

COLA G. PARKER, president of Kimberly-Clark Corp., has been elected to the board of directors of the Myasthenia Gravis Foundation. The group was organized in 1952 to foster and support research into the cause of this disease, which is apparently caused by an abnormality in the body's chemical balance.

W. Michigan Class of '53 Enters Industry

While two of the 1953 class of paper technology graduates at Western Michigan College, Kalamazoo, will remain in educational circles, the remaining five have accepted industrial positions, according to a report by Dr. Alfred H. Nadelman, director of the curriculum.

RAYMOND JANES of Grand Rapids has been awarded a graduate fellowship to the Institute of Paper Chemistry, Appleton, Wis., and *DAVID J. KRASKE* of Rumford, Maine, will remain at Western Michigan as a research assistant.

Other seniors and the firms with which they will be associated are as follows: *JAMES DUNLAP*, S. D. Warren Co., Muskegon, Mich.; *RUSSELL LARSON*, American Boxboard Co., Filer City, Mich.; *ALLEN UHL*, Swift & Co., Chicago; *JAMES WINN*, Hartford City Paper Co., Hartford City, Ind., and *FRANK YANKOVIAK*, Sutherland Paper Co., Kalamazoo.

MELVIN H. BAKER, chairman of the board of National Gypsum Co., has been given an honorary Doctor of Commercial Science degree by Carson-Newman College in Jefferson City, Tenn. He is an alumnus of the 102-year-old institution.

Gardner Board & Carton Announces Four Changes

STANLEY W. TROSSET JR. has been named chemist in charge of production in the raw materials division at the Lockland and Middletown, Ohio, plants of Gardner Board & Carton Co. He has been with the firm 21 years and is a graduate of Transylvania College.

In other Gardner changes, *KENNETH F. MacLEOD* has been appointed an industrial engineer; a native of Montreal, Mr. MacLeod previously held similar positions with St. Regis Paper Co. and with Johns-Manville Corp. *ROBERT L. MILES,* who has been with the firm since 1950, has been promoted to coordinator of personnel development; he was formerly administrative assistant to Richard L. Siegel, director of industrial and public relations. In an operational change, *ROY E. (Jack) DUNN* has been made rotogravure foreman at the Lockland plant; he joined Gardner in 1941 as a trucker and last year attended the printing school sponsored by the firm at West Virginia Institute of Technology.

Crown-Zellerbach Promotes Three

Crown Zellerbach Corp. has announced the following promotions effective May 25.

RAY J. SCHADT, for the past three years resident manager at the newsprint division in Port Angeles, Wash., has been assigned to the firm's Portland, Ore., office in connection with matters dealing with the pending acquisition of St. Helens Pulp & Paper Co. A graduate of the University of Washington, he has had 21 years' service with C-Z and was for a time assistant to the late Albert Bankus, Crown Zellerbach vice president.

HAROLD F. CARPENTER, supervisor of industrial and community relations at Camas, Wash., for the past nine months, has been promoted to resident manager at Port Angeles to succeed Mr. Schadt. Mr. Carpenter joined the firm in 1932 as a paper tester at Carthage, N.Y. From September 1951 to January 1953 he was assistant resident manager at Port Angeles.

RICHARD E. LAWTON, personnel assistant at Camas for the past nine months, succeeds Mr. Carpenter as Camas supervisor of industrial and community relations. He became associated with C-Z in 1937.

Three men prominent in the paper industry have been awarded honorary memberships in T'sai Lun, a fraternity of paper technology students at Western Michigan College at Kalamazoo. They are: *E. T. A. COUGHLIN,* chief of the paper and paper products unit, U. S.

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Investigate our liquid chlorine for bleaching and bleaching compounds, for direct chlorination of wood and waste paper pulps and for water treatment. Tested shipping methods assure safe delivery and trouble-free operation in your plant.

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Mill evaluations show that PLURONIC F68, the only 100%-active flake nonionic surfactant, improves absorbency and softness of paper towels. It is an excellent paper softener, with a minimum reduction in strength. PLURONIC F68 with sulfamic acid is excellent for washing felts . . . increases felt-life as much as 100%.

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Wyandotte CHEMICALS

Army Quartermaster Corps; *OLIN W. CALLAGHAN* of Edgar Bros. Co., and *RAYMOND BARTON* of Michigan Paper Co.

DOROTHY D. LACKEY, chairman of the board, treasurer and a director of Cohoes Envelope Co. since 1945, has been elected president of the firm. She replaces Wade A. Morehouse.

DAVID MACK has been named to the newly created position of vice president in charge of employee relations of Lily-Tulip Cup Corp. He joined the firm in 1952 as director of employee relations.

David Mack

L. W. Hagstrom

LEONARD W. HAGSTROM has been promoted to assistant to the manager of the Consumer Products Division of Crown Zellerbach Corp. He was formerly assistant sales manager for multiwall bags.

RICHARD A. WELCH has been appointed supervisor of industrial relations at the Lockland, Ohio, plant of Gardner Board & Carton Co. He was formerly wage and salary administrator at the Louisville plant of International Harvester Co.

WILLIAM H. WALTERS, president of United States Printing & Lithograph Co., Cincinnati, has been elected president of the Folding Paper Box Association of America.

JAMES H. BLACK has been made vice president of Canadian Chemical & Cellulose Co. Ltd., Montreal. He will continue as treasurer, a position he has held since the firm was formed a year ago.

EDGAR G. BURTON, president of Simpsons Ltd., Simpsons-Sears Ltd. and Robert Simpson Co., Ltd., Toronto, has been elected a director of Howard Smith Paper Mills Ltd. He fills a vacancy caused by the recent retirement of his father, C. L. Burton.

DENNIS E. COUSINS has been promoted to the position of vice president in charge of production for all mills of Hollingsworth & Whitney Co. Mr.

Cousins, who joined the firm in 1938, was previously vice president at Mobile, Ala.

EMIL HOLZWART, production manager for General Box Co., has been named vice president in charge of production. Mr. Holzwart has been with General Box since 1936.

BURNHAM B. HOLMES has been promoted to the newly created position of vice president in charge of paper products, purchasing, and traffic for Ball Bros. Co.

K. G. BAKER has been made director of personnel for Howard Smith Paper Mills Ltd. He was previously associated with Howard Smith's legal department.

GORDON DILNO, assistant general sales manager for Sutherland Paper Co., Kalamazoo, Mich., has been named chairman of the newly formed group of the Folding Paper Box Association of America that has been organized to promote standardization of packaging for bakery goods on a national basis.

IRA C. KELLER has voluntarily resigned as executive vice president of Container Corp. of America. He was elected a vice president of the firm in 1939.

DONALD F. McCALL has been named assistant general manager of Everett Pulp & Paper Co., Everett, Wash. He was formerly vice president and a director of Racquette River Paper Co.

D. F. McCall

P. C. Meelfeld

PAUL C. MEELFELD has been named sales promotion manager of the container division of Robert Gair Co. Inc. He was formerly assistant vice president in charge of advertising and sales promotion at Hinde & Dauch Paper Co.

VINCENT W. RICHARD, formerly general superintendent of Keith Paper Co., has been made general superintendent of Crocker-McElwain Co. of Holyoke, Mass. At the same time, *JOHN P. RILEY*, former machine superintendent, was made general superintendent of Chemical Paper Mfg. Co. The announcement of the appointments was made by Clifford J. Yarber, production manager for both firms.

TILMAN PRICE has been promoted to beater foreman at the Lockland, Ohio, plant of Gardner Board & Carton Co. He joined the firm in 1930.

JOSEPH A. METZGER, formerly assistant to the director of personnel of Bemis Bros. Bag Co., has been named personnel manager of the Armour Research Foundation of the Illinois Institute of Technology at Chicago.

JOHN G. ROBINSON, project engineer for Weyerhaeuser Timber Co.'s hardboard plant at Klamath Falls, Ore., will become superintendent of the new unit when it begins initial operation in the fall. The plant will manufacture a wide variety of pressed and moldable fiber products.

The Paper Industry Necrology

Russell H. Bentz

Russell H. Bentz, 40, vice president in charge of manufacturing for P. H. Glatfelter Co., Spring Grove, Pa., died May 13 while on a vacation trip at Sturbridge, Mass.

A chemical engineering graduate of Lehigh University, Mr. Bentz became associated with Glatfelter in 1935 as a member of the engineering department. After gaining experience in various parts of the plant, he was named assistant mill superintendent and later was appointed assistant to the executive vice president. For the past two years he had served as vice president for manufacturing.

R. H. Bentz

In addition to holding memberships in Tappi and the Superintendents Association, he was a member of the Society for the Advancement of Management and the American Management Association.

Joseph D. Joynt, 60, employed for 15 years as a beater engineer at Dexter Sulphite Pulp & Paper Co. mill in Dexter, N. Y., died May 18.

William Clyde Gouldman

William Clyde Gouldman, vice president, secretary, a director and sales manager of Chesapeake Corp. of Virginia, died May 15 in a Richmond hospital following a brief illness. He was 65.

Mr. Gouldman was associated with several Virginia newspapers in an editorial capacity before he joined Chesapeake Corp.'s predecessor, Chesapeake Pulp & Paper Co., in 1916. He was also president and a director of David Weber Co. of Philadelphia.

George E. Loomis

George E. Loomis, retired paper mill superintendent for Eastern Corp. at Lincoln, Maine, died April 10. A native of Pennsylvania, he became associated with Eastern in 1914; previously he had been employed by Hammermill Paper Co. at Erie, Pa. Mr. Loomis had been a member of the Superintendents Association since 1928.

Charles J. Ludwig, 64, general superintendent of the Chillicothe, Ohio, plant of The Mead Corp., died recently in a Chillicothe hospital. He joined the firm in 1905 and became superintendent 28 years ago.

Johannes van Reekum, co-founder of van Reekum Paper Co., bulk paper exporters with offices in 58 countries, died at New Rochelle, N. Y., April 20. He was 60 years old.

Robert Miller Schrader, 55, general manager of purchases for Continental Can Co., died April 24 in New York, N. Y. He joined the firm in 1917 as assistant storekeeper at Chicago.

Joseph Schwartz, 76, president of Pacific Diamond H Bag Co., died in San Francisco April 29.

Mrs. Florence M. Lynch, 62, of Le Mars, Iowa, died April 29. She was a vice president of Pacific Paperboard Co. of Longview, Wash., and president of Lynch Pulp & Timber Co. Mrs. Lynch had been the only woman member of the advisory board of the Pulp and Paper Section, National Production Authority.

The Paper Industry Safety News

Contest Report for First Quarter Shows 10% Drop from 1952

COMPARED TO the identical 1952 period, the first quarterly report of the NSC Paper Industry Safety Contests shows a 10 per cent drop in the accident frequency rate for all divisions. According to an announcement from the National Safety Council, 173 contestants have maintained perfect scores in the January-March period. This compares to approximately 150 last year.

The March frequency rate for all divisions was 8.42, while that for the first three months was 8.29, a 10 per cent decrease from the 9.23 for the same 1952 period. In the pulp and paper division the March rate was 7.28, that for the first quarter 7.65, down 17 per cent from last year. In paper converting the quarterly rate was 10.12, up 10 per cent from 1952.

There is a total of 462 participants in the 1953 competition, 378 of whom reported for March. For the first quarter 173 firms reported perfect records. They are as follows:

Division I—Pulp and Paper Mills

Group A

Gulf States Paper Corp., Tuscaloosa, Ala.
Kimberly-Clark Corp., Kimberly, Wis.
Consolidated Paper Corp. Ltd., Wayagamack Div., Three Rivers, Que.
Kimberly-Clark Corp., Memphis, Tenn.
St. Regis Paper Co., Kalamazoo, Mich.
Quebec North Shore Paper Co., Baie Comeau, Que.
Crown Zellerbach Corp., Port Townsend, Wash.

Group B

Brown Corp., La Tuque, Que.
Price Bros. & Co. Ltd., Riverbend, Que.
The Great Lakes Paper Co. Ltd., Fort William, Ont.
P. H. Glatfelter Co., Spring Grove, Pa.
Crossett Paper Mills, Crossett, Ark.
Publishers' Paper Co., Oregon City, Ore.
Consolidated Paper Corp. Ltd., Port Alfred, Que.
Brunswick Pulp & Paper Co., Brunswick, Ga.
Fraser Companies Ltd., Edmundston, N.B.
National Container Corp., Mill Division.
Kimberly-Clark Corp., Terrace Bay, Ont.
Macon Kraft Co., Macon, Ga.
St. Croix Paper Co., Woodland, Maine.
Wausau Paper Mills Co., Brokaw, Wis.
Gaspesia Sulphite Co. Ltd., Chandler, Que.
Schmidt & Ault Paper Co., York, Pa.

Group C

Manitoba Paper Co. Ltd., Pine Falls, Man.
St. Lawrence Corp. Ltd., Red Rock, Ont.
International Fibre Board Ltd., Gatineau, Que.
Crystal Tissue Co., Middletown, Ohio.
The Mead Corp., Sylva, N.C.
Crown Zellerbach Corp., Carthage, N.Y.
Container Corp. of America, Wabash, Ind.
Masonite Co. of Canada Ltd., Gatineau, Que.
Price Bros. & Co. Ltd., Jonquiere, Que.
Riverside Paper Corp., Appleton, Wis.

Group D

Central Fibre Products Co., Quincy, Ill.
Congoleum-Nairn Inc., Cedarhurst, Md.
Bird & Son Inc., Shreveport, La.
Allied Paper Mills, Bardeen Mill, Ostego, Mich.
Fraser Companies Ltd., Newcastle, N.B.
Container Corp. of America, Los Angeles.
The Mead Corp., Harriman, Tenn.
National Container Corp., Ontonagon, Mich.
The Bartgis Bros. Co., Ilchester, Md.
Hollingsworth & Vose Co., West Groton, Mass.
Container Corp. of America, Circleville, Ohio.
The Flintkote Co., Lockport, N.Y.
Crown Zellerbach Corp., Lebanon, Ore.
Central Fibre Products Co., Tama, Iowa.
Marathon Corp., Ashland, Wis.
The Mead Corp., Columbian Division, Bristol, Va.
U. S. Gypsum Co., Oakmont, Pa.
Coos Bay Pulp Corp., Anacortes, Wash.
Hennepin Paper Co., Little Falls, Minn.
Strathmore Paper Co., Mill No. 1, Woronoco, Mass.
Lloyd A. Fry Roofing Co., Compton, Cal.
Lloyd A. Fry Roofing Co., Irving, Texas.
Spaulding Fibre Co. Inc., Milton, N.H.
The Philip Carey Co. Ltd., Lennoxville, Que.
Manistique Pulp & Paper Co., Manistique, Mich.
The Mead Corp., Nashville, Tenn.
National Gypsum Co., Kalamazoo, Mich.
Lloyd A. Fry Roofing Co., Summit, Ill.
St. Regis Paper Co., Herrings, N.Y.
Lloyd A. Fry Roofing Co., Moorehead City, N.D.
American Writing Paper Corp., Nonotuck Div., Holyoke, Mass.
Lloyd A. Fry Roofing Co., Houston, Tex.
The Flintkote Co., Little Ferry, N.J.
Container Corp. of America, Chattanooga, Tenn.
Lloyd A. Fry Roofing Co., Brookville, Ind.
Lloyd A. Fry Roofing Co., Jacksonville, Fla.
Container Corp. of America, Wilmington, Del.
The Flintkote Co., Mt. Carmel, Ill.
The Logan-Long Co., Franklin, Ohio.
St. Regis Paper Co., Watertown, N.Y.
Alton Box Board Co., Alton, Ill.
Johns-Manville Corp., Tilton, N.H.
The Munroe Falls Paper Co., Munroe Falls, Ohio.
Dexter Sulphite Pulp & Paper Co., Dexter, N.Y.
Volney Felt Mills Inc., Mishawaka, Ind.
American Writing Paper Corp., Mt. Tom Div., Holyoke, Mass.
International Paper Co., Riley, Maine.
Logan-Long Co., Amalgamated Roofing Mills Div., Chicago.
International Paper Co., Livermore Falls, Maine.
Spaulding Fibre Co. Inc., North Rochester, N.H.
Volney Felt Mills Inc., Fulton, N.Y.

Division II—Paper Converting

Paper Bags

Union Bag & Paper Corp., Savannah, Ga.
Bemis Bros. Bag Co., Mobile, Ala.
The Bartgis Bros. Co., Ilchester, Md.
Bemis Bros. Bag Co., Houston, Tex.
Crown Zellerbach Corp., Los Angeles.
Thilmany Pulp & Paper Co., Kaukauna, Wis.
St. Regis Paper Co. Ltd., Vancouver, B.C.

Boxes and Cartons

Group A

Marathon Corp., Wausau, Wis.
Container Corp. of America, Chattanooga, Tenn.
Container Corp. of America, Medford, Mass.
Container Corp. of America, Cincinnati.
Container Corp. of America, Los Angeles.
Container Corp. of America, Folding Div., Manyunk, Philadelphia.
Fort Wayne Corrugated Paper Co., Chicago.

Group B

Container Corp. of America, Baltimore.
Container Corp. of America, Knoxville, Tenn.
Gaylord Container Corp., Greenville, N.C.
Gaylord Container Corp., Tampa, Fla.
Union Bag & Paper Corp., Box Plant, Chicago.
Container Corp. of America, Greensboro, N.C.
Gaylord Container Corp., Carton Plant.
Green Bay Box Co., Corrugated Div., Green Bay, Wis.
Container Corp. of America, Portland, Ore.
South West Box Co., Sand Springs, Okla.
Hankins Container Co., Elmira, N.Y.
Container Corp. of America. Los Angeles.
Hankins Container Co., Chicago.
Container Corp. of America, Sixth St., Philadelphia.
Container Corp. of America, Piqua, Ohio.
Container Corp. of America, New Orleans.
Green Bay Box Co., Green Bay, Wis.
Bay West Paper Co., Green Bay, Wis.
Container Corp. of America, Muskogee, Okla.
Container Corp. of America, Sioux City, Iowa.

Roofing Paper

The Flintkote Co., E. Rutherford, N.J.
The Ruberoid Co., Joliet, Ill.
The Ruberoid Co., Mobile, Ala.
Bird & Son Inc., Roofing Plant. Chicago.
Lloyd A. Fry Roofing Co., York, Pa.
Lloyd A. Fry Roofing Co., S. Kearny, N.J.
Lloyd A. Fry Roofing Co., Waltham, Mass.
Lloyd A. Fry Roofing Co., Minneapolis.
Lloyd A. Fry Roofing Co., Robertson, Md.

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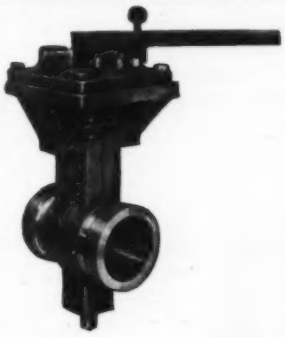
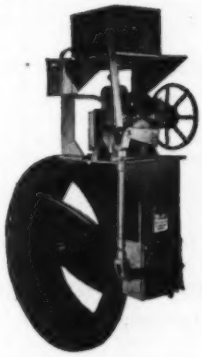


No. 674—Special 2½-inch stainless steel valve with 150 psi construction. Standard sanitary type threads. Heavy duty handlever assembly Type No. 681.

No. 848—Heavy duty valve with rubber seat for water service at high velocity. Handwheel operates valve through spur gear and pinion into a threaded reach rod (enclosed Type No. 700) in order to obtain sufficient torque to seat disc in rubber.



No. 847—Heavy duty valve with electric motor operator mounted directly above valve and positioned by pressure controller mounted above the motor.

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(The above tabulation does not include 34 firms that had perfect records for the January-February period but who failed to report their March figures; also, five firms whose man-hours worked were below the minimum according to contest rules.)

West Virginia P & P Adds Supply Store to Tyrone Safety Program

FOLLOWING SIX MONTHS' operation, the safety supply office and protective equipment store at the Tyrone, Pa., mill of West Virginia Pulp & Paper Co. has become an integrated part of the plant's accident prevention program.

Issuance of equipment is made upon requisition, approved by the supervisor or foreman, with the item being replaced when necessary on return of the original issue. Items supplied through the store include protective helmets; goggles of various types; face shields; safety clothing and shoes; respirators; first aid kits, etc.

So well has the new centralized office worked out that management has reported that a minimum savings of $2,000 for the first year of operation is expected. According to Robert K. Meredith, Tyrone safety director, more safety shoes have been sold since the store opened than were sold during the entire previous fiscal year. Shoes may be purchased through payroll deductions; previously, payment had to be in full at the time of purchase. (All other items of safety equipment, except prescription goggles, are supplied employees without cost.)

Costs reduced

An indication of the efficient working of the mill's new project, with protective equipment purchase and control being vested in the safety department, is the fact that goggle cost, which in 1945 stood at $2.37 per day, has been reduced to slightly under 56 cents per day. "When we started our program," Mr. Meredith has declared, "we didn't have eye protection. We just had a large stock of goggles. Now, the men know what they are for, how they should be used, and they are taking care of the equipment we issue to them. The same is true of all other items that we issue to them without cost.

"The necessity of using any and all of the protective devices we supply our employees is brought home to our men in many ways. This centralized safety supply store, with its display case and the Sales Talks on Safety that are given to all employees visiting the store, has gone far towards making every man realize that he has a responsibility—which he shares with management—to take every precaution not only for his own safety but to set an example for his fellow employees."

TRANSACTION at Westvaco safety store at Tyrone finds William Jones (left), safety office supply clerk, issuing an M. S. A. Dustfoe respirator to John Patrick

Abets regular program

The supply store project so recently instituted at Tyrone only furthers the overall safety program that has been carried on for some years. Safety posters are displayed throughout the entire mill; safety leaders point out possible hazards and how to avoid them; reminders are placed in pay envelopes, and frequent safety meetings are staged.

Spurred by the results shown at Tyrone, the West Virginia management has used the safety program there as a standard to be followed in other plants.

It was eight years ago that the present program had its inception. In the first six years of operation, lost-time accidents at Tyrone were reduced some 97 per cent. The mill received a national award for having achieved an accident frequency rate of only 0.59, as opposed to one of 63.36 six years previously. During all of 1952 only one lost-time accident was reported.

First aid classes are conducted for key men on each shift in the various departments. Special teams whose duty it is to check areas for noxious and dangerous gases receive frequent instruction. These special teams have been equipped with several items manufactured by Mine Safety Appliances Co. of Pittsburgh, including M. S. A. Explosimeters, combustible gas indicators and hydrogen sulfide detectors. Before workers are permitted to enter any tank, pit or other area in which explosive or toxic gases or vapors might be found, one of these specially trained men has to thoroughly check the atmosphere with the instruments supplied him. It is not until he pronounces the area "safe" and signs a report to that effect that the workmen can begin their tasks.

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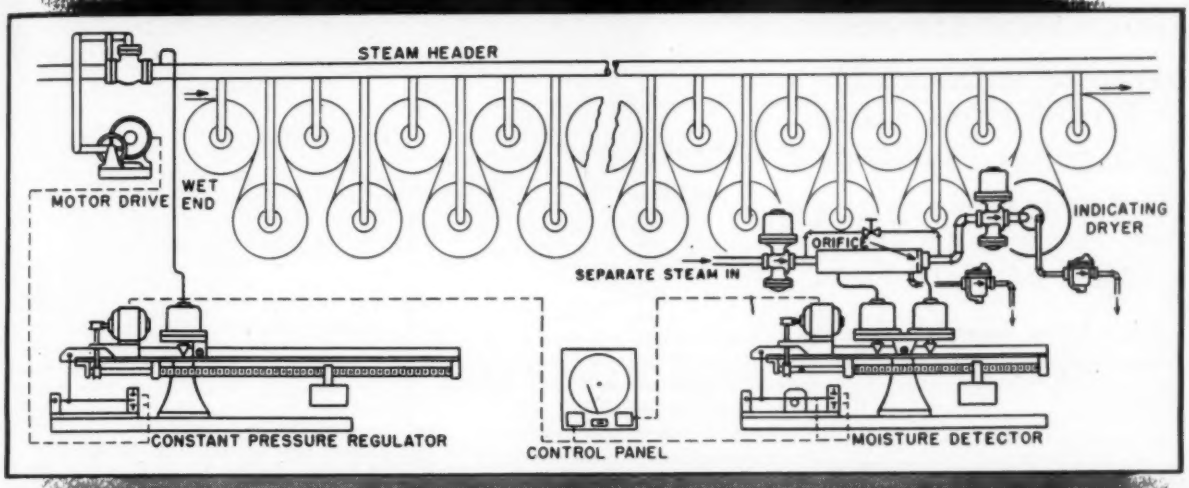

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THE Armstrong Moisture Control utilizes an *indicating dryer* to measure the moisture in the sheet. Moisture changes are acted upon by a Moisture Detector, which controls a Main Pressure Regulator to vary steam pressure on all dryers except the indicating dryer. It is simple in principle and remarkably sensitive to slight changes of moisture in the sheet.

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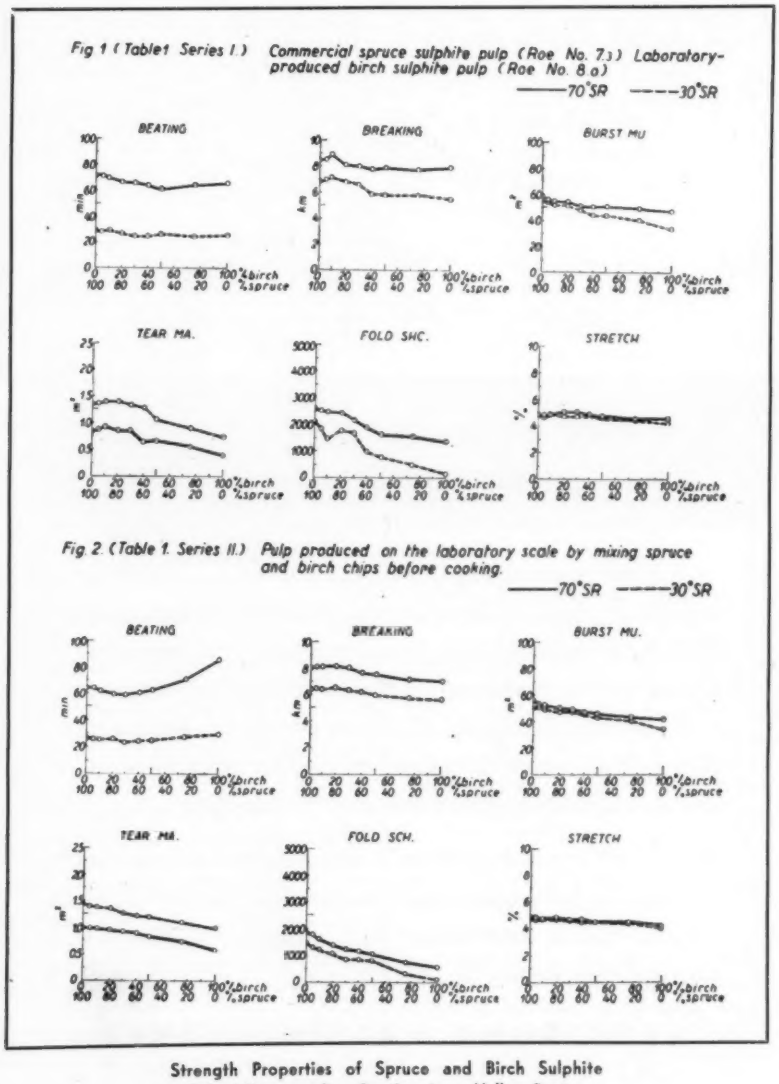

Strength Properties of Spruce and Birch Sulphite Pulp Mixtures after Beating in a Valley Beater

Strength properties of birch and spruce sulphite pulp mixtures

This is a contribution from the Institute of Wood Chemistry of the University, Abo Academi, in Finland; a previous contribution in a related field was abstracted in The PAPER INDUSTRY (May 1952, p. 254). The results of the present investigation are shown graphically in Figs. 1 and 2. Evidently, the addition of 10 per cent birch pulp to spruce sulphite may cause a very slight improvement in tear and in breaking length. However, the influence of birch is unfavorable with regard to folding endurance. Somewhat over 10 per cent birch may be added without seriously affecting pulp quality. Waldemar Jensen and Heikki Jorri. *Paper and Timber* (Finland), **35**, 35-37 (1953). (Original in Swedish, with English summary and tabulations in English.)

Paper pulp from bagasse

The author has searched for the minimum amount of chemical required to produce an easy bleaching pulp from bagasse. The results from various pulping processes are compared; these include the usual kraft process, the Pomilio process, the Swedish "Gruco" process (which is a modified kraft, involving less chemicals, lower temperatures and shorter cooking periods than normal), a combined water prehydrolysis and kraft, a neutral sodium sulfite, a sodium bisulfite, and a combination of the sodium sulfite and bisulfite processes. Of these, the kraft, Pomilio and sodium sulfite processes are found to be the most satisfactory and of these three processes, the Pomilio process gives the strongest pulp (as judged by the product of breaking length and tearing area, and by the product of burst and tearing area). The highest yields, both of bleached and unbleached pulps, are greatest in the case of the sodium sulfite digestions, but these pulps are the weakest.

According to the author's interpretation, the kraft pulps correspond more closely to easy bleaching sulfite pulps, the Pomilio pulps to strong spruce sulfite pulps; whereas sodium sulfite pulps resemble more closely bleached spruce sulfite pulps. Two photomicrographs, 14 references and 9 tables are given. Olavi Perila. *Paper and Timber* (Finland), **35**, 29-34 (1953). (Original in Finnish, with an English summary.)

Ink transfer to representative paper sample

This is another contribution from the Graphic Arts Research Laboratory in Sweden (cf. The PAPER INDUSTRY, **34**, 1148 [1952] for an earlier paper, in which some of the terms used are defined).

A flatbed letter press is used in printing on cellophane (I), glassine (II), a supercalendered paper (III) and a coated paper (IV). Ink distribution, the independent variable, is studied for these papers at various printing pressures, printing speeds, and for various viscosities, and amounts of oil introduced on the printing surface (these all being the independent variables). The following general conclusions are drawn: an increase in printing pressure increases the ink distribution between form and paper. Increasing the amount of ink on the form increases the ink distribution up to a maximum. Increasing the printing speed or the viscosity of the ink decreases the ink distribution number.

The printing pressures are determined by the use of a pressure-sensitive printing block with a printing surface of 5 x 12 mm., the longer side running in the direction of the cylinder axis. The printing speeds are determined from contacts built into the press. Inks contain mineral oils of varying viscosities, measured at 25° C. The amount of ink on a printing surface is weighed before and after printing and the ink distribution number calculated.

Besides individual experiments, the ink transfer is compared for the three papers (I), (II), and (III), using two printing pressures. When printing with a mineral oil, there is no difference in ink distribution between I and II. A change in printing pressure is shown to have a greater influence on ink distribution at high printing speeds than at low ones. This is true for both I and II. III shows a more favorable ink distribution than do I and II. In the case of III there appears to be no

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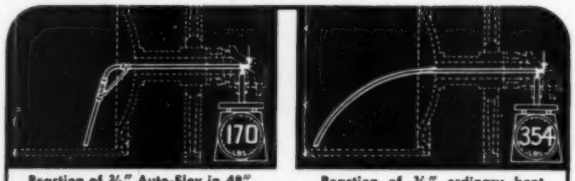

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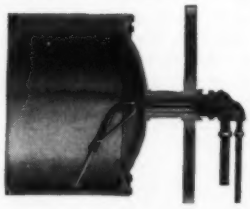

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interaction between printing pressure and printing speed. This may be due to poor reproducibility of the measurements. By printing with commercial printing inks the same general tendencies are noted as with the oils used with I, II and III, but reproducibility is poorer than in the case of printing with oils.

The data in all experiments are treated statistically. Ingemar Olsson and Lennart Pihl. *Svensk Papperstidn.*, **56**, 197-201 (1953). (In English.)

Papermaking courses at Manchester

The Manchester University, College of Technology, has instituted a Papermaking section, a scale model of the new accommodations being shown in Fig. 1. The college has a full range of papermaking and testing equipment, including a 60 cm. Fourdrinier machine (Fig. 2) with speed ranges of 1.5 to 15 m. per min., which is well adapted to teaching purposes. A stainless steel rotary digester is shown in Fig. 3.

The B. S. Tech. degree in papermaking (at the "ordinary" or "higher level") may be secured; and under certain conditions, the M. S. and Ph. D. may be obtained. Research problems are not strictly limited to those having an immediate application to papermaking. The laboratories can also be used by research workers of ability who may wish to follow some independent line of investigation (without necessarily working for a higher degree).

Arrangements have been made for students to visit paper mills, printing works, and manufacturers of machinery, wires and felts. Certain "refresher courses" are encouraged. Wilfred W. Barkas. *Svensk Papperstidn.*, 56, 16-19 (1953). (In English.)

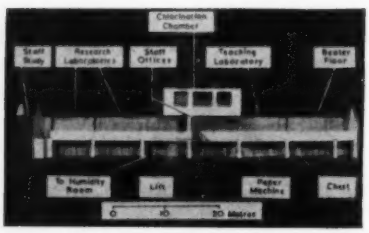

Fig. 1—Scale model of the new accommodation for the Papermaking Section. The portion to the right of the lift is in use at the time of writing

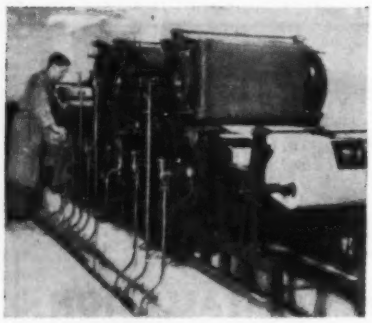

Figure 2

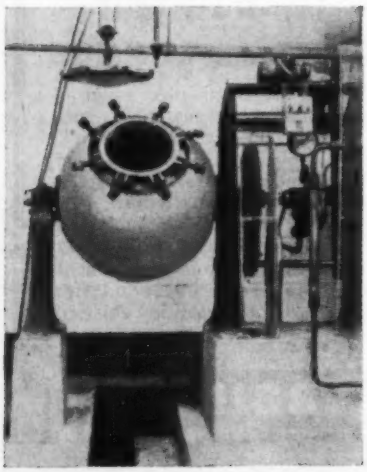

Figure 3

Cellulosic raw materials from India

This is a series of papers which deal with a continuation of studies at the Forest Research Experiment Station at Dehra Dun, India, on fibrous raw materials that may serve the Indian pulp and paper industry (cf. The PAPER INDUSTRY, **34**, 1266 and 1267 [1953]).

(VI) In India paper mulberry reproduces itself naturally and is a fast grower in light, well drained sandy loam. In an area in which the annual rainfall is 120 inches, yields of six tons of air-dried wood per acre per year are obtained on an experimental plot. The wood gives an easy bleaching kraft pulp, which, with about 25 per cent of longer fibered material (like that from bamboo), gives good writing and printing papers.

(VII) This article deals with the pulping of a reedlike, perennial grass with a creeping rhizome and is termed *Phragmites karka*, which grows abundantly along river banks and in marshes. Laboratory and pilot plant experiments show that it yields clean pulps that are relatively easily bleached, and which can be prepared by the soda or kraft processes in about 40 per cent yield. Mixed with sabai grass or bamboo pulps, it gives satisfactory writing and printing papers. The best conditions for cooking these grasses involve the use of about 22 per cent chemical (based on oven-dried material) with 45 gm. of chemical per liter, and a cook at 153-62° for 6 hours.

(VIII) *Boswellia serrata* is a hardwood growing in the dry hills of India; this lends itself to sulfate pulping with bleached pulp yields of about 40 per cent. In admixture with longer fibered pulps, this also furnishes satisfactory writing and printing papers.

(IX) The wood of *Sterculia camponulata* serves to furnish groundwood in the manufacture of newsprint.

(XI) *Andropogon contortus* (or *Heteropogon contortus*) often termed spear- or kusal grass may be converted into kraft pulp, readily bleached by hypochlorite (in two stages), giving a 35 per cent pulp yield, which is decreased somewhat when an intermediate alkaline stage is used. The pulp has satisfactory strength properties, but it is recommended that longer fibers be admixed with the kusal grass pulp to improve the sheet.

(VI) R. V. Bhat and S. R. D. Guha, *Indian Forester*, **78**, 93-9 (1952); (VII) R. V. Bhat and K. C. Virmani, *Ibid* 127-37 (1952); (VIII) R. V. Bhat, S. R. D. Guha, and S. P. Panda, *Ibid* 169-75 (1952); (IX) R. V. Bhat and K. C. Virmani, *Ibid* 222-8 (1952); (XI) R. V. Bhat and M. G. Karnik, *Ibid* 331-8 (1952); through *C.A.*, **47**, 3560-61 (1953). (In English.)

A new apparatus for determining wet strength

The author describes a new piece of equipment (Figs. 1 and 2) for determining wet web strength. The apparatus is based on bursting a very limited area by means of air and measuring the bursting strength in terms of millimeters of water. The apparatus is so designed that the sheet itself forms the membrane. However, air permeability of the sheet influences the rise in pressure in the pressure chamber (cf. Fig. 2), and to eliminate this factor as much as

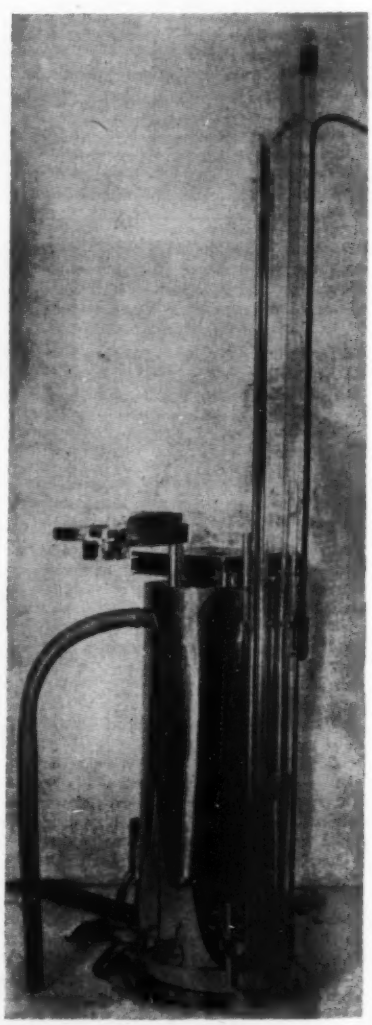

Fig. 1—The new wet web bursting strength apparatus

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possible, the volume of the pressure chamber is made large as compared with the volume of air passing through the sheet during the bursting test. The pressure rise is effected by forcing water into the pressure chamber at a constant rate. As a suitable rate of pressure rise, 50 mm. of water per sec. is chosen.

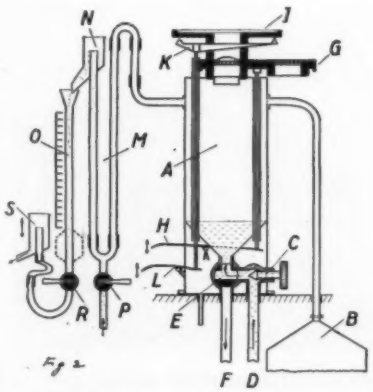


Fig. 2—Schematical drawing of the new wet web bursting strength apparatus showing: (A) pressure chamber 1; (B) pressure chamber 2; (C) needle valve; (D) water inlet; (E) three-way valve; (F) outlet valve; (G) sheet holder; (H) lever of the sheet holder; (I) limiting ring; (K) holder of the limiting ring; (L) lever of the limiting ring; (M) water manometer; (N) overflow; (O) measuring tube; (P) filling valve; (R) bottom valve; and (S) zero-set overflow

The test sheet is placed in the holder (G), which is perforated in four places with a large number of closely spaced holes (cf. Fig. 3); these are 1.2 mm. in diameter. The perforated circular spots may in turn be tightly connected with the air space in chamber (A) by means of the lever (H). The operation of the apparatus is fully described. The bursting pressure is read on a water manometer (M) having an overflow (N) and the pressure is measured in tube (O), a buret, in which the amount of water equivalent to the pressure is measured. Full directions are also given for preparing the fragile test sheets and the special precautions that must be taken.

The author discusses the influence of variations in the rate of pressure rise, the reproducibility (which in sheets containing dry matter within the range of 13-25 per cent involves a precision of about 4 per cent) and the influence of the dry matter content. He also gives comparative data on the wet web bursting strength and the tensile strength (using the equipment described by Brecht). These comparative data are given in the graph in Fig. 4. Apparently the bursting strength is slightly more sensitive to variations in pulp quality than is tensile strength. Fourteen references. Georg von Alfthan. *Paper and Timber* (Finland), **35**, 68-72 (1953). (In English.)

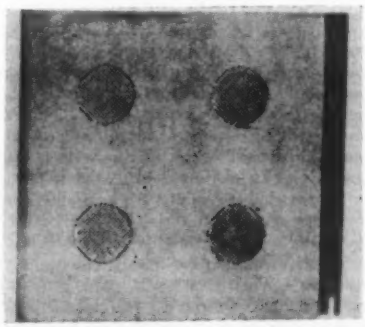


Fig. 3—The sheet holder from above

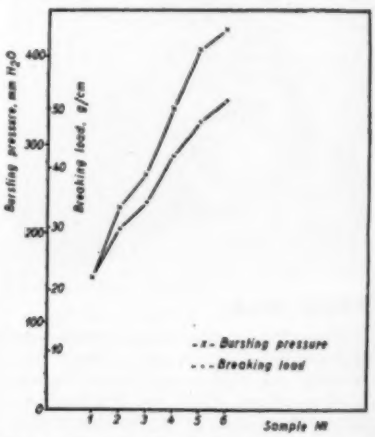


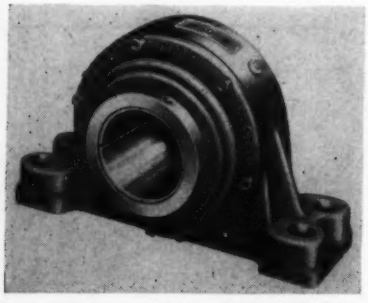
Fig. 4—Wet web strength at a dry matter content of 18 per cent. The bursting pressure has been determined with the new apparatus and the breaking load with Brecht's apparatus

The Paper Industry New Products

Spout for pulpwood chipper

A new "V" type spout for pulpwood chippers will fit any chipper, regardless of the make. Because of its specially designed V shape, the spout will hold any size stick or log. The wood moves in a straight line without side movement to retard cutting. By holding the wood firmly it will reduce sawdust, improve chip quality and chip uniformity. Jam-ups are eliminated by the specially designed hinged cover operated by a cable to a point convenient to the chipper operator, as illustrated, showing the spout in closed position.

The "Murco" V spout is heavy-duty design of fabricated steel and can readily be installed. *D. J. Murray Mfg. Co., Wausau, Wis.*



Pillow blocks

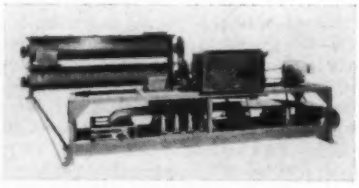
A new line of all-steel pillow blocks, providing high load-carrying capacity in a compact and rugged package, has recently been announced. These new bearings are a joint achievement by Dodge Mfg. Corp. and Timken Roller Bearing Co.

High radial and thrust capacities and the stamina to take heavy-shock loads have been provided within minimum dimensions and with far less than usual weight. The bearings are fully self-aligning, with spherical outer race, and are available in both expansion and non-expansion types, with an adapter mounting. Double piston ring seals keep the lubricant in and dirt and dust out of the bearing mechanism. The bearings are sealed both on and off the shaft. *Dodge Mfg. Corp., Mishawaka, Ind.*

Humectant

"Hartexsol C," a new development in the field of humectants, is more effective than c.p. glycerine in attracting moisture, according to the manufacturer. This humectant, available as a water-white viscous liquid, is claimed to show approximately 10 per cent greater hydroscoposity than glycerine.

A few examples of the application of this humectant are: as a flame resistant treatment to flameproof paper and other materials; in starch glues to make the paste smoother and prevent separation of water from the paste caused by contraction of the starch, and as a general hydroscopic and plasticizing agent. *Hart Products Corp., 1440 Broadway, New York, N. Y.*

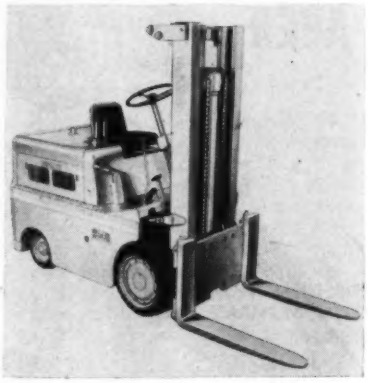


Feed regulating weigher

A new feed regulating Transportoweigher for automatically and continuously transporting, weighing and maintaining pre-set rate of feed of any finely divided material is now available.

The weight integrator, mounted in a dust tight cabinet, is a completely mechanical, gear differential type, the speed of one side varying as the conveyor belt speed, the other side varying as the momentary weight on the suspended idlers. The output shaft is geared directly to the direct reading tonnage totalizer. There is no inherent error in the integrator, according to the manufacturer, and pneumatic and electrical connections are not necessary for its operation. The scale suspension is of the free floating type, restrained from response to longitudinal and lateral type movement by simple check links attached to the frame.

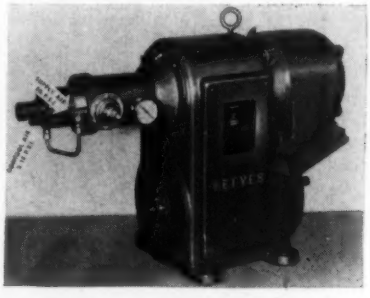
Transportometer units are available for a wide range of applications of continuous, automatic weighing, totalizing, transporting and feed regulation for installation on new or existing belt conveyors, and between conveyors and processing equipment. *Sintering Machinery Corp., Transportometer Div., Netcong, N. J.*



Fork lift truck

For ruggedness and high serviceability in the 6,000 to 7,000-lb. range, the new model "Utilitruc," gas or electric powered, features major improvements. Designed for endurance, efficiency, and ease of maintenance and repairs, the new fork lift truck is now available for domestic and export markets.

A new fork mounting, approved and recommended by the Industrial Truck Association, is standard on both Utilitruc models. This new mounting is an important step toward interchangeability of attachments and devices between all makes of trucks with comparable capacity. "Free-lift" of 25 inches, and more lift is provided by a new upright design which does not increase upright height. Greater driver visibility is afforded by this new design. *Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*



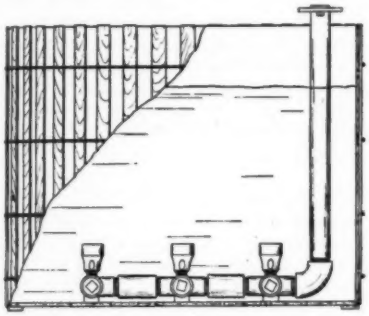
Pneumatic control drive

Conoflow control has been added to Reeves present line of automatic controls available. The Conoflow control is available on all integral horsepower Vari-Speed Motodrives for use in conjunction with instrumentation air pressure of 3-15 psi. These variable speed drives with Conoflow control have 6 to 1 maximum speed ranges on all units with capacities to 25 hp. The present hydraulic and pneumatic controls

still are available on these drives, in addition to the new Conoflow cylinder.

Addition of the Conoflow control permits the variable speed drives to control liquid levels in tanks, whether of the open or enclosed types. In addition, this control makes it possible to use the Motodrive for automatically controlling flow proportioning systems of liquid, gas, chemicals, grain, etc., as well as pressure and temperature.

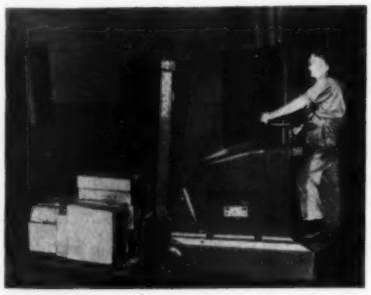
Connection is made direct to the Conoflow cylinder on the drive from a pneumatic controller. This cylinder is prelubricated and no outside lubrication is necessary. This type control may be operated from the present air supply in a plant, and it can easily be connected to any pneumatic control instrument. *Reeves Pulley Co., Columbus, Ind.*



Nozzles

Nozzles constructed of Haveg have recently been added to the line of standard Sparger nozzles.

Used in the tank heating of liquids, Haveg Sparger nozzles resist the action of many chemicals and provide quick, uniform distribution of heat over a large volume of liquid. Simple in design, these nozzles are made of Haveg 60, a molded product highly resistant to acids, salts, and solvents. When conditions necessitate, they are constructed of Haveg 41. *Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.*



Fork truck

An electric "stand-up" fork truck, the "Stoway," which can operate within its own length, has recently been announced as the newest addition to Clark's line of materials handling equipment. This fork truck is designed for warehousing and freight terminals where close quarters and narrow aisles demand high maneuverability and where the driver must continually mount and dismount. It has a capacity of 2,000 lb. at 24 in., 2,500 lb. at 15 in., and 1,650 lb. at 30 in. *Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*

Condensate return units

A new line of Apco-Matic condensate return units, both Simplex and Duplex, are available in a capacity range suitable for handling condensate for heating systems with ratings from 800 to 10,000 EDR and pressures up to 50 psi.

These units combine the latest features in vertical turbine-type pump design with minimum space requirements, and completely automatic, quiet operation, with minimum loss of heat units. Compactness with maximum capacity is achieved by means of a rectangular receiver. A low return opening is convenient for connection to return lines close to the floor, yet provides ample suction head for efficient operation. Dual discharge openings provide optional connection for piping to boiler. A mechanical seal prevents all leakage. Replacement of worn parts or the complete unit can be made without disturbing piping connections. *Aurora Pump Co., 110 Loucks St., Aurora, Ill.*

Knife grinder

The latest Rogers medium-duty knife grinder, the "NL" grinder, is an automatic all-steel welded cabinet base machine particularly adapted to the care of many types of knives, including rag cutter knives, trimmers, light veneer knives, light chipper knives, hog knives, light shear blades, paper and stock cutter knives, and many others.

The new grinder incorporates the latest electric table drive, including Rogers designed special control switches and 1½ hp special reversing motor. Table speeds are variable and table reversals are smooth and shock free. All grinding pressures are absorbed by the heavy base through the carefully machined combination of flat and angled "V" ways, which are self-aligning.

Included as standard equipment is a 3 hp heavy-duty ball bearing grinding head motor. The wheel is a 14-in. diameter segmental type and is moved to the work automatically in desired increments. The knife bar is of the box type with two faces to handle either thick or thin knives. A quick set-up device can be provided. Any angle can be easily set for bevel grinding. *Samuel C. Rogers & Co., 183-205 Dutton Ave., Buffalo 11, N. Y.*

Flame failure safeguard

For flame failure protection of commercial and industrial oil burning equipment, the Fireye flame failure safeguard, Type F18T-3, has been introduced. It provides operating flame failure protection for manually ignited oil burners, air heaters, ovens, kilns, etc., and is used with programming controls to protect automatically ignited oil burner installations. On existing installations, this safeguard is readily substituted for slow acting thermally responsive switches to give increased flame failure protection.

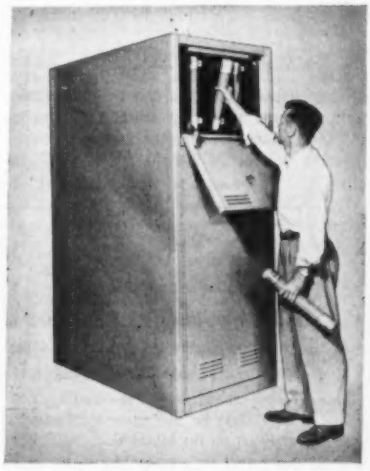
The safeguard consists of a phototube and amplifying system housed in a compact, dust-tight aluminum case. Special heat-resisting filters and insulating fins serve to insulate thermally the housing from the high furnace temperatures so that the entire control may be mounted directly on the furnace wall.

Other features include a hermetically sealed time delay element which prevents the flame relay from dropping out from purely transient disturbances, a pilot light to indicate flame failure which can be viewed through an angle of 180°, and a cover switch to prevent unsafe operations of the control should the cover be removed. *Combustion Control Corp., 77 Broadway, Cambridge 42, Mass.*

Toggle switch assemblies

Precision toggle switch assemblies of a new type for multiple circuit control will find wide use in any electrical equipment where manual or mechanical multiple circuit control is required. They are available with from one to 10 double-throw switching elements, all operated by a single lever. The lever may be detented in the center and either or both extreme positions, or may be self-returning to the center.

Each switching element is Underwriters' Laboratories listed at 10 amps. up to 250 v ac and will handle 30 v dc inductive loads at 10 amps. at sea level and 6 amps. at 50,000 ft. altitudes. *Micro Switch, Div. of Minneapolis-Honeywell Regulator Co., Freeport, Ill.*



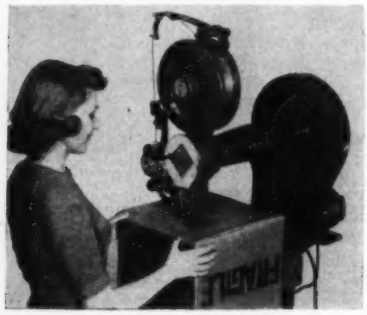
Fuse compartment

A new gang-operated disconnect method for de-energizing the fuses on high voltage motor control and for making them safe and convenient for handling has recently been developed.

The new high voltage fuse compartment, which has the trade name "SA-Fuse," uses a movable panel on which current-limiting fuses are gang-mounted. The fuse panel has disconnecting blades behind the panel. When the fuse compartment door is opened,

the fuse panel is automatically pulled to the front of the compartment, disconnecting the fuse panel from the line, and putting the fuses within easy reach. The operator can then safely and easily remove and replace the fuses without a hook stick.

Mechanical and electrical interlocks prevent the fuses being disconnected when the switch is closed and prevent closing the motor switch with the door open. Target indicators on the door tell whether the motor switch is opened or closed, and whether the fuse panel is connected or disconnected. The door can be locked with the fuse panel in either connected or disconnected position. *Electric Machinery Mfg. Co., Minneapolis 13, Minn.*



Carton stitching method

Arcuate wire stitching, a new carton stitching method, has recently been introduced. This new method takes regular flat stitching wire, puts an arc into it prior to the stitch-forming operation, then drives and clinches the stitch at higher speeds. According to the manufacturer, arcuate wire stitches are stronger, lighter, and practically buckle free. Also, because each pound of wire now produces many more stitches, wire costs are lowered considerably.

The arc shape of the wire gives these stitches higher column strengths. Because of this, arcuate stitches can be made from lighter gauge wire, resulting in a saving in wire. Each coil will now produce a greater number of stitches. Other advantages of the arcuate stitching method include: virtual elimination of jamming, lengthening of operating periods (between re-loads), formation of perfect stitches more consistently, less machine down time, and elimination of puncturing box liners. *Acme Steel Co., 2836 Archer Ave., Chicago 8, Ill.*

Ram attachment

A new side-shifting ram with a 6 in. lateral movement is now being offered as an optional attachment for the straddle-type electric tiering truck. This ram may be used in handling any material having a center opening.

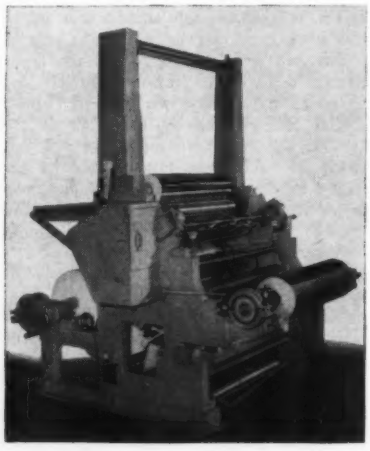
The new attachment will move 3 inches either side of the center of the truck's mast. It is being furnished with the standard Raymond tractor. As a result, the unit is highly maneuverable and may be used in aisles only 6 ft. wide. When the mast is raised, the ram has a maximum elevation of 130 in. *Raymond Corp., 8098 Madison St., Greene, N.Y.*

Battery charge indicator

To help obtain greater efficiency and maximum economy with industrial truck batteries, a new and improved charge indicator has been introduced.

The instrument can be easily mounted so that the operator can see the dial at all times, thus giving him instantaneous readings of the state of battery charge while his truck is operating. An easy-to-read, three-colored dial indicates whether the battery is "full", "½", "empty", or in "danger".

The indicator, a Wheatstone bridge type instrument, is readily adjustable for 3, 6, 12, 15, 18, and 24-cell batteries; a series of resistors and taps permits the desired adjustment. The meter is balanced to read accurately regardless of its mounting or the truck's position. A toggle switch disconnects the indicator from the battery during charge. *Gould-National Batteries, Inc., Trenton 7, N. J.*



Foil mounting machine

A new glue-hot-melt foil mounting machine, known as the Inta-Roto foil mounter, Type GHM, is designed for speeds of 400 to 1,000 ft. per minute. It is not much larger than a good sized office desk, and all vital controls are within reach of the operator. There is no drying tunnel. Fast thread-ups are possible. Output is such that a battery of two machines, one operator to each, can keep a third man busy taking material off.

The machine comes as a complete unit, including two unwind and rewind shafts, two doctor blade holders, yardage indicator, gas drying unit with safety devices, tank and pump for circulating glue, and 7½ hp variable speed Reliance or General Electric motor drive. It may be equipped for high-speed glue line laminating, and for wax laminating. *Inta-Roto Machine Co., Byrd Airport, Richmond, Va.*

New Products Briefs . . .

HUMIDITY CONTROLLER—A new "plug-in" humidity controller now on the market fulfills the need for a simple automatic humidistat control to operate electrically powered humidifiers and dehumidifiers. This control operates in much the same way as a room-type thermostat. All that is necessary is to hang the control on the wall and turn the dial to the percentage of relative humidity desired. *Abbeon Supply Co., 179-15 Jamaica Ave., Jamaica 32, N. Y.*

GRAVITY CONVEYOR—A new steel wheel-aluminum frame gravity conveyor that combines strength with lightness answers the need for a highly portable conveyor that has the durability to stand up under heavy loads. It is manufactured in 45 and 90-deg. curves, 5, 8 and 10-ft. lengths, and 12 and 18-in. widths. The conveyor is available with a wide choice of wheel spacings ranging from 6 to 18 wheels to the foot. *Rapids-Standard Co., Inc., Dept. AS, 342 Rapistan Bldg., Grand Rapids 2, Mich.*

ACRYLIC MONOMER—Acrylamide, a new acrylic monomer, is a crystalline product with comparatively long shelf life and easily gained polymerization and copolymerization. Potential applications for the polymers and copolymers of this monomer include the preparation of adhesives, dispersing agents, thickening agents, surface coatings, synthetic leathers and rubbers, and finishing agents for paper and textiles. *American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y.*

FLOOR PATCH MATERIAL—A new fast-setting floor patch material contains both metallics and pure rubber latex. It is claimed to have a strength approximately 250 per cent greater than ordinary floor patch materials. Known as Das-Patch, this material can be applied as it comes from the container to wet or dry cement, concrete asphalt, brick or mastic floors by a single handyman. *Dasco Chemical Co., Inc., Baltimore, Md.*

ALUMINUM PAINT—"Super Hot" is a new ready-mixed aluminum paint that, when applied to practically any metal surface, becomes permanently bonded to this surface upon subjecting the painted metal to heat of from 500 to 1600° F. It is said to maintain its brilliance and will not crack, chip or peel. It may be brushed, sprayed or dipped and air dries within 30 min., after which time heat can be applied. *Sheffield Bronze Paint Corp., 17814 Waterloo Rd., Cleveland 19, Ohio.*

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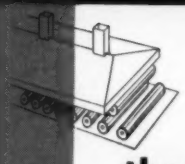

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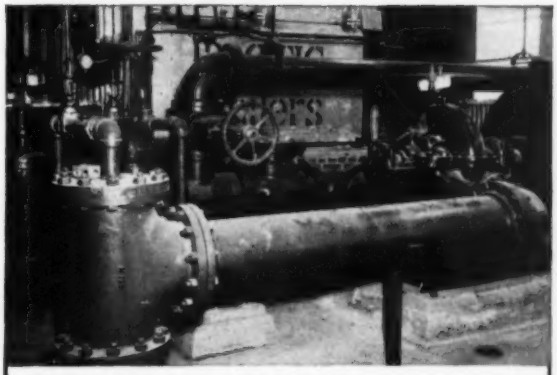
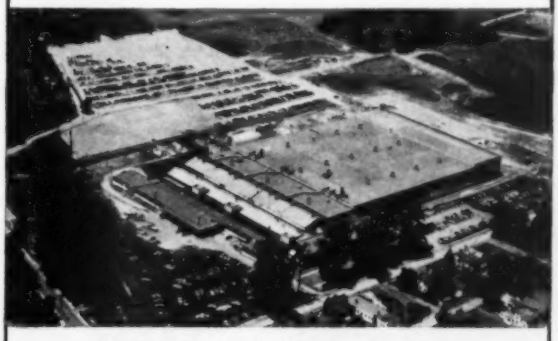
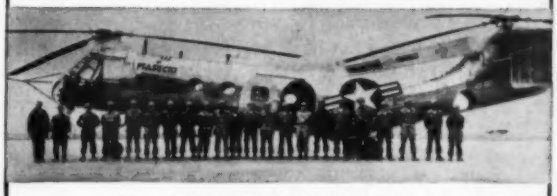


"K" Fittings in
largest helicopter plant

Conspicuous in the above photo are some of our big flanged tees and elbows. You will also see several of our companion flanges and screwed elbows. This is one of the numerous installations of "K" Fittings in the world's largest helicopter plant, that of Piasecki Helicopter Corporation, Morton, Pa.



Plant of Piasecki Helicopter Corporation



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Combined marketing facilities with Malleable Iron Fittings Company, Branford, Conn.

The Paper Industry New Literature

Books

THE BOLTON AWARD, 1952. Published by John W. Bolton & Sons, Inc., Lawrence, Mass. 6 x 9¼. 90 pages.

Thirteen prize winning articles of the Fifth Bolton Award Contest on the subject, "Successful Selection of Supervisory Personnel," are contained in this book. The contest is sponsored under the auspices of The American Pulp and Paper Mill Superintendents Association, and a committee of judges chosen by them selected the winners whose papers are published in this book.

PROCEEDINGS OF THE 16TH ANNUAL TIME AND MOTION STUDY AND MANAGEMENT CLINIC. Published by Industrial Management Society, 35 East Wacker Drive, Chicago 1, Ill. 168 pages. $4.00.

Complete transcripts of talks by top leaders of labor, management and government on various topics, including time study, motion economy, methods, plant layout, materials handling, wage incentives, maintenance, and human relations are contained in this book. Also included are charts, forms and illustrations.

CONDUCTIMETRIC ANALYSIS AT RADIO FREQUENCY. By G. G. Blake. Published by Chemical Publishing Co., Inc., 212 Fifth Ave., New York 10, N. Y. 5¾ x 8¾. 109 pages. $2.75.

"In this book, Mr. Blake describes important advances made by him in experimental methods for examining the electrical properties of solutions and for various related investigations in pure and applied science, physical and biological," states O. U. Vonwiller, emeritus professor of physics at the University of Sydney, in the foreword. The author's new technique and methods of conductimetric analysis, sometimes called amperometric titration, are described; and the details of setting up reliable apparatus for carrying out analyses and titrations are given.

The author's radio-frequency technique is rapid and accurate and, in addition to regular solutions, it is also suitable for the titration of colloidal solutions, when precipitates are present, and for microtitration.

Radio-frequency methods, by which a large or small quantity of any reagent can be compounded rapidly to match in concentration a small quantity of any standard solution without using a chemical balance, are described in detail. The Q-metric method of measuring the rate of diffusion of liquids and the automatic control of liquid flow are explained.

Brief descriptions of various types of moisture meters are given. A list of references, which is included, makes it possible for the reader to obtain first-hand information if desired.

Among the applications discussed are: alcohols, plant nutrition, agriculture, biology, leather tanning, papermaking, electrotherapeutics, chemical purity, drinking water, and control of chemical processes.

Booklets and Pamphlets

DESK CALCULATOR. Published by Pangborn Corp., Hagerstown, Md. Pocket size folder. Formulas, constants and conversion factors useful in basic engineering, blast cleaning and dust control calculations are presented in easy-to-use form. Included are geometric relationships for circles, squares, cylinders, spheres, pyramids, etc.; measures of pressure; and calculation guides for determining tank capacities in gallons. Other major categories of basic information include formulas for dust control work, tables on shot and grit sizes, and metric measurements and conversion factors.

TECHNICAL NOTES, NOS. 381 TO 385. Published by Lake States Forest Experiment Station, University Farm, St. Paul 1, Minn. 8 x 10½. Topics covered in these one and two-page papers are as follows: Logging Damage to Reproduction Under Swamp Black Spruce; Cubic Content of Sawlogs in Standing Trees; Power-Saw Girdling Saves Time in Timber Stand Improvement; Ten Years' Pulpwood Production in the Lake States (1942-1951); and Frill Girdle Tests with 2,4,5-T in Lower Michigan. Three tables and a graph are included.

TWO METHODS OF ARTIFICIAL RESPIRATION. Published by National Safety Council, 425 North Michigan Ave., Chicago 11, Ill. 18 x 24. 12 pages. "Arm-lift back-pressure" and "hip-lift back-pressure" methods of artificial respiration are described in this new safetygraph, consisting of spiral bound pages inserted in a portfolio so that it can be set on any flat surface and opened to form an easel. On the pages facing the audience are drawings of the various steps in both methods. The explanation of each is printed on the back pages in large type for the use of the instructor. A discussion of the problem of changing operators during the resuscitation cycle is included.

A CATALOG OF PERSONNEL MATERIALS. Published by Science Research Associates, 57 West Grand Ave., Chicago 10, Ill. 5½ x 8½. 32 pages. This special catalog of personnel tests and employee relations material, developed for business and industrial use, contains materials designed to help select better employees, improve operating efficiency, increase effectiveness of supervision, choose employees for promotion, reduce employee turnover, prevent accidents on the job, and increase employee performance.

TREATMENT OF CELLULOSE AND CELLULOSE DERIVATIVES WITH PEROXYGEN COMPOUNDS (Bulletin No. 43). Published by Buffalo Electro-Chemical Co., Inc., Station B, Buffalo 7, N. Y. 8½ x 11. 11 pages. This booklet is divided into three sections: Reduction of Degree of Polymerization of Cellulose; Refining of Cellulose, and Treatment of Viscose Filaments. Literature references are listed as an appendix to the bulletin.

MANUAL OF LABORATORY SAFETY. Published by Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa. 48 pages. This new, illustrated book has chapters on accident prevention, first aid, fire prevention and safety equipment. A safety bibliography covering a wide range of fields is included, as well as a reproduction of the Laboratory Emergency Chart (revised edition), which contains, in alphabetical order, rapid treatments for a comprehensive list of laboratory mishaps, both external and internal.

WORLD TRADE DATA. Published by *Exporters' Digest*, 170 Broadway, New York 38, N. Y. 48 pages. 50 cents. This reference booklet for world traders includes charts on international mail and messages, predominating electrical voltages used abroad, conversion factors, overseas import control regulations, commercial abbreviations, consuls in the United States, and an international airlines directory. *Exporters' Digest's* annual survey on credit terms being granted in principal world markets and other useful data is also presented.

CONVEYOR TERMS AND DEFINITIONS. Published by Conveyor Equipment Manufacturers Association, One Thomas Circle, Washington 5, D. C. 64 pages. A manual on standard nomenclature for conveyor types and parts, this booklet contains about 1500 listings and line drawings of more than 80 types of conveyors and parts. For major items it includes terminology in French, German, Italian and Spanish, as well as in English. In addition to the glossary of terms, the manual contains a brief account of the conveyor industry in the American system of mass production, as well as a membership list and a brief history of the association.

EIGHTY NEW TEST METHODS. Published by American Standards Testing Bureau, Inc., 44 Trinity Place, New York 6, N. Y. 8½ x 11. 4 pages. Eighty different methods for testing, inspecting, and analyzing some 90 different types of products are listed. Several methods are touched on

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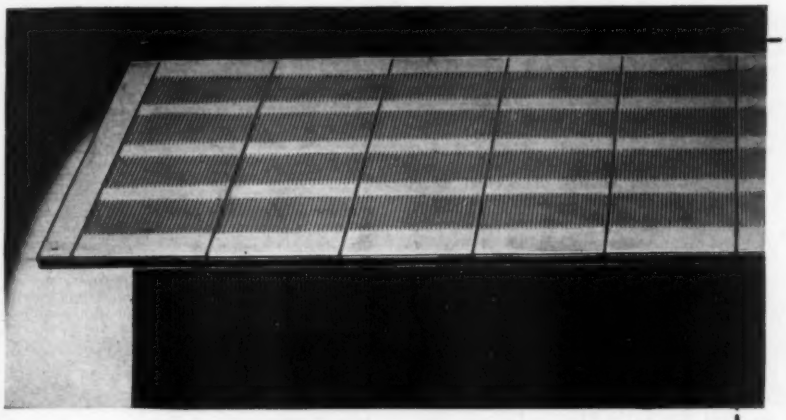

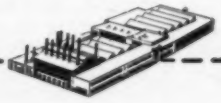

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briefly, such as non-destructive testing, testing for performance, corrosion resistance, protective coatings, chemical analysis, development of specifications, product certification, and the seal of approval.

THE ANILINE STORY. Published by National Aniline Division of Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. 6¾ x 10. 6 pages. This brochure gives the history of aniline and describes its many present uses and future possibilities.

SPECIFICATIONS FOR METAL POWDER SINTERED BEARINGS (OIL IMPREGNATED), 16-52T. Published by Metal Powder Association, 420 Lexington Ave., New York 17, N. Y. 25 cents. This new Standard is identical in substance to A.S.T.M. Standard B202, prepared originally by A.S.T.M. Committee B-9. It contains specifications on such factors as composition, basis of purchase, density, porosity, crushing strength requirements and others necessary in the purchase of bearings.

VACUUM—THE MAGIC HAT OF INDUSTRY. (Form 164). Published by Ingersoll-Rand, 11 Broadway, New York 4, N. Y. 8½ x 11. 12 pages. A magazine reprint from *Compressed Air* magazine, this article is written in simple, non-technical language and describes the varied uses of vacuum throughout industry. It also discusses the methods of making a vacuum. Included are two full-page charts on vacuum uses and manufacture.

Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.

Valves. Lunkenheimer Co., Box 360-U, Cincinnati 14, Ohio—This new 506-page illustrated catalogue features a special 24-page thumb-index guide to valve selection. Lunkenheimer's complete line of steel, iron and bronze valves, lubricating devices, boiler mountings, cocks and other products are described in detail and illustrated in the catalogue, which also covers specifications and technical information.

Dial Indicators. Taylor Instrument Companies, Rochester 1, N.Y.—A new 24-page bulletin (98214) describes the latest development in 6 in. dial indicators for temperature, pressure, and load applications. Many illustrations are included and information supplied on features, dials and scales available, together with reference material on the different types of actuation. For temperature instruments, a variety of sensitive elements or bulbs are clearly explained and the recommended applications for each given. Mounting dimensions for the different types of instruments are included.

Motor-Generator Sets. Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10, Ohio—Engineered motor-generator sets for all industries are the subject of a new 4-page bulletin (F-2502). Briefly described is the complete line of "custom-tailored" M-G sets, shunt or compound wound, from ¾ to 1,000 kw. Also included are six typical applications of Reliance M-G sets, showing their utilization for large single-motor drives, excitation of synchronous machinery, multi-motor drives, and "spot conversion," an economical means of supplying D-C power at the point of use.

Plate Magnet Separators. Eriez Mfg. Co., Erie, Pa.—A new 4-page brochure (No. B-603) on low-cost permanent electric Model "C" plate magnets, applicable to all but the heaviest tramp iron removal problems, is now available. Typical installations of these separators, widely used in processing lines, are illustrated with engineering drawings and photographs.

Revolving Carriage. Towmotor Corp., 1226 E. 152nd St., Cleveland 10, Ohio—Uses of revolving carriages and the method of operation are given in a 2-page bulletin. A table of dimensions and capacities, and ordering information are also included. Many photographs and a dimensional drawing of the carriage on a fork lift truck are shown.

Thermometers. Minneapolis-Honeywell Regulator Co., Station 64, Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.—Specification Sheet 612 describes Brown indicating and recording thermometers with pneumatic control. Construction and engineering details are included.

Materials Handling Equipment. Lewis-Shepard Products, Inc., Dept. R-1, Watertown, Mass.—A new all-products circular (80-200) is now available. Incorporating the many new "Spacemaster" models, this circular includes descriptions and photographs of basic units in the "Master" line: electric fork trucks, five models of the "JackStacker" and a section on the new "JackLift" electric models. In the hand line, stackers, hoisters and working height lifters, skid platforms and storage racks, hydraulic and mechanical trucks, and basic models of several floor trucks are also included and fully illustrated.

Flexible Tubing. Flexible Tubing Corp., Guilford, Conn.—A complete line of flexible tubing, in diameters from less than 1 to 30 in., is described in a new 4-page catalogue (C2-3). Various applications of this tubing are illustrated.

Microfilming. Remington Rand Inc., 315 Fourth Ave., New York 10, N.Y.—A seven-point service for placing records permanently on microfilm is outlined in an 8-page bulletin (BSD-5). Four types of microfilming are described. Remington Rand readers are illustrated and described.

Rust Preventive Coating. L. Sonneborn Sons, Inc., Dept. P-5, 80 Eighth Ave., New York 11, N.Y.—4-page Technical Data Guide No. 10, a 6-page bulletin, and a color card all contain information on S.R.P., a specially formulated rust preventive coating.

Demineralization. Permutit Co., 330 W. 42nd St., New York 36, N.Y.—To help explain one of the newer roles that ion exchangers are playing in industry, a new 28-page bulletin, "Demineralization including Silica Removal by Ion Exchange," has been prepared. This new bulletin (3803) describes the chief applications, principles of operation, design features, advantages, recommendations and specifications of Permutit's demineralizing and silica removal apparatus and synthetic resins.

Instrumentation. Minneapolis - Honeywell Regulator Co., Station 213, Industrial Div., Wayne & Windrim Aves., Phiadelphia 44, Pa.—Bulletin 2802, entitled "Instrumentation for the Paper Industry," tells in 30 well-illustrated pages how Honeywell can help the mill to increase production and quality and lower operating costs. Sixteen major mill applications are covered in the bulletin, which contains application drawings and installation photographs of all applications. Also included in the bulletin are specific references to literature that covers all applications and Honeywell products in great detail.

Pneumatic Tube System. Lamson Corp., Syracuse 1, N.Y.—"On Target," a new colorful 50-page booklet, pictures and describes many uses for Lamson Airtube systems in modern industry and commercial enterprise. It shows how the handling of paper work is speeded and simplified by the installation of a pneumatic tube system. Full information on carrier types and dimensions, as well as basic operation of the system, are included. A number of case histories of industrial and commercial firms which have installed this system are presented. A technical data section gives full details on the component parts of the Airtube system. Power units are also described.

Helical Gear Drives. Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.—Helical gear drives, their advantages, fields of application and correct selection, are discussed in a new, illustrated 16-page booklet, No. 2451. Full-page cross-sectional views show in detail the design and construction features of both the double and triple reduction types. Installation photographs picture typical installations. All factors governing correct selection are described in detail. Horsepower ratings for all drives, in all ratios, for various input speeds, are shown in tabular form. Load classes for 170 types of machines are tabulated. Other tables give the maximum overhung loads for drives of various sizes. Principal dimensions of the various drives are shown.

Air Hose. B. F. Goodrich Co., Akron, Ohio—Designated as Catalogue 3460, this 4-page publication describes five grades of air hose with tough, oilproof covers to prevent peeling. Specifications are listed, and materials and methods used in construction are described, along with recommended uses for the various types of air hose.

Heaters. General Electric Co., Schenectady 5, N.Y.—The 1953 60-page edition of Catalogue GEC-1005D on Calrod electric heaters and heating devices describes the equipment in terms of application, special features, installation and pricing. Indexed by process and application, the catalogue also contains methods of determining power requirements and heat losses by applications. These are explained by graphs and formulas. Another feature is an index of G-E application bulletins, and data and specification sheets available. A total of 175 photographs and drawings illustrate the various heater-types of products, including immersion, strip, cartridge, tubular, insertion, and fin heaters. Also described are melting pots, thermostats, switches, oven heaters, and induction heaters.

Plastics & Resins. Bakelite Co., Div. of Union Carbide & Carbon Corp., 300 Madison Ave., New York 17, N.Y.—Properties and uses of more than 50 Bakelite and Vinylite plastics and resins are described and illustrated in a new, revised reference file, consisting of 16 pages. Short descriptions of the wide range of special and general-purpose Bakelite phenolic, styrene and polyethylene and Vinylite plastics and resins are presented in 22 categories under 8 major headings: Molding and Extrusion Materials; Protective Coating Resins; Rigid Sheets; Flexible Film and Sheeting; Wire and Cable Insulation; Calendering Materials; Laminating, Bonding, Adhesive Resins, and Packing Materials. Applications and finished products are shown in 110 photographs.

Humidification. Abbeon Supply Co., 179-15 Jamaica Ave., Jamaica, N.Y.—The 4-page bulletin entitled "A Few Facts About Humidification" covers the following topics: What is meant by Relative Humidity, What Problems are Associated with Low Humidities, and How to Overcome Low Humidity. In addition, it describes the various models of industrial humidifiers, humidity indicating instruments, and home and office humidifiers. Also included is a 2-page bulletin on humidification for the paper and printing trades.

Flotation Recovery. Denver Equipment Co., 1400 Seventeenth St., Denver 17, Colo.—How conditioning efficiency increases flotation recovery is the subject of 2-page Bulletin A2-B3, which contains specifications, data and drawings to illustrate the operation and construction of the Denver super-agitator and conditioner.

Speed Changers. Metron Instrument Co., 432 Lincoln St., Denver 9, Colo.—4-page Bulletin No. 100 (Revised) describes miniature fixed ratio speed changers.

Welding. Eutectic Welding Alloys Corp., 172nd St. & Northern Blvd., Flushing 58, N.Y.—A new 64-page "How to weld it" manual entitled "Tool and Die Salvage Welding" is now available.

Maintenance Painting. Wilbur & Williams Co., 130 Lincoln St., Boston (Brighton) 35, Mass.—A quick reference index maintenance painting guide in the form of a compact 4-page folder is available to maintenance superintendents and engineers. Maintenance problems of

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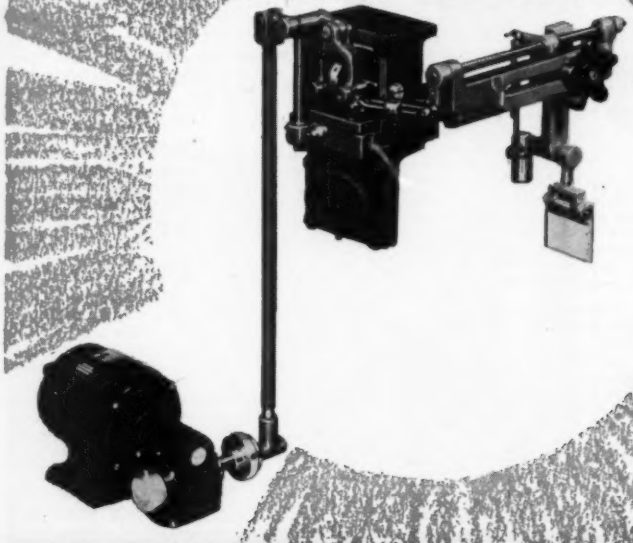

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industry are discussed and the answers for them listed. Painting of metal for rust control, painting without odor, protecting concrete floors and walls, protection against chemicals and corrosion are some of the topics which are covered. How to cut maintenance costs through the use of paint coatings designed for the purpose is clearly outlined.

Grommet V-Belt. Allis-Chalmers Mfg. Co., 991 S. 70th St., Milwaukee, Wis.—The "Texrope" grommet v-belt is described in 4-page Bulletin 20B6497A. Cross section illustrations of the v-belt are included.

Metal Hose. Flexonics Corp., 1315 S. Third Ave., Maywood, Ill.—This 4-page bulletin (CMH-115R) describes RT-6 and RT-8 flexible metal hose, including full specification data.

Thermocouple Glands. Conax Corp., 4515 Main St., Buffalo 21, N.Y.—Bulletin TC-1, containing 4 pages, fully illustrates the complete line of Conax bare wire thermocouple glands. Specifications and suggested applications are given. The principle of sealing is explained. Drawings and photographs are included.

Flotation. Denver Equipment Co., 1400 Seventeenth St., Denver, Colo.—Designated as No. F10-B13, this 4-page bulletin deals with "The Unseen Factors in Flotation." Two photographs, four tables and a graph are included.

Caustic Soda. Wyandotte Chemicals Corp., Wyandotte, Mich.—This 56-page booklet contains a wealth of information on caustic soda. Some of the topics covered are: the history of caustic soda, U.S. production, uses, lime soda process, electrolytic process, forms and containers, shipping information, pricing, materials of construction, safety precautions, chemical reactions, analytical methods, etc. Included is a dilution graph and an appendix containing numerous graphs and tables.

Conveyor Belt. Baldwin Belting, Inc., 76 Murray St., New York 7, N.Y.—This 4-page bulletin describes Baldwin "Tread-Top" belting, including specifications.

Materials Handling Trucks. Lewis-Shepard Products, Inc., 125 Walnut St., Watertown, Mass.—Two new comparison charts covering the riding and walkie-type electric industrial trucks, both high and low lift, are now available to industry. The first is entitled "Riding Type High Lift and Low Lift Electric Truck Comparison Chart" while the other is called, "Walkie Low Lift and High Lift Electric Truck Comparison Chart." The charts, with buying guides listed, are designed to permit an objective point by point comparative analysis of various makes. Printed on heavy stock, the charts are a convenient size for filing.

Water Treatment. Minneapolis-Honeywell Regulator Co., Station 213, Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.—Data Sheet 29.0-1, containing 4 pages, describes some of the instruments and control accessories applicable to the control of water treating plants. Included in the sheet are a drawing of a typical application, and photographs and descriptions of several Honeywell products.

Integrator. Instron Engineering Corp., 2 Hancock St., Quincy 71, Mass.—This 5-page bulletin presents a general description of the Instron integrator and lists applications in varied fields of research and industry. The principle of operation is explained with the aid of a diagram. Other information includes input requirements, a description of a two-counter model integrator, an explanation of the integration of two independent signals, specifications, and price schedule.

Spray Nozzles. Schutte & Koerting Co., Dept. J-K, Cornwells Heights, Bucks County, Pa.—20-page Bulletin 6-A contains complete technical details on atomizing and spray nozzles. Atomizing nozzles, spray nozzles, and spray nozzle clusters are treated in separate sections of the bulletin. Information given for each type of spray nozzle includes construction details, spray characteristics, and capacities. Dimension tables, capacity charts, and drawings supplement text material.

Machine Tool Conduit. Flexonics Corp., 1414 S. Third Ave., Maywood, Ill.—This 2-page bulletin (CMH-108R) presents a description of Chicago Metal Hose machine tool conduit and fittings, together with a list of outstanding advantages and specifications.

Program Controllers. Minneapolis-Honeywell Regulator Co., Station 213, Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.—8-page Bulletin 1501 describes ElectroniK strip chart program controllers with electric set point index drive, used for automatic regulation of time-temperature control programs. Models available, construction details, typical applications, specifications, dimensions and data on auxiliary equipment are included.

Open Flow Nozzle. Builders-Providence, Inc., 345 Harris Ave., Providence 1, R.I.—This 8-page technical bulletin (135-J5) on the Kennison open flow nozzle provides pertinent engineering information, including accuracy, construction, dimensions, installation and capacities of the nozzle. The bulletin describes some of the uses of the Kennison nozzle, e.g., measurement of the flow of liquids with and without the presence of suspended matter. The bulletin also presents other applications in industry.

Plastic Pipe. Triangle Conduit & Cable Co., Inc., Plastic Products Div., New Brunswick, N.J.—A new 16-page brochure on plastic pipe contains all pertinent information on Triangle's four types: flexible, semi-rigid, rigid high impact, and rigid polyvinyl chloride pipe. Detailed tables give chemical and physical characteristics of each type. Also included are advantages of using plastic pipe and simple directions on how to install and join the pipe.

Steam Trap. W. H. Nicholson & Co., 12 Oregon St., Wilkes-Barre, Pa.—2-page Bulletin No. 351 features a new Type D thermostatic bellows steam trap recently added to the Nicholson line. Applications, construction and operation are described. Three tables which are included give list prices and dimensions, maximum capacity in lb. per hour at various pressures, and a list of parts and their prices.

Transmission Systems. Fischer & Porter Co., 7250 Jacksonville Rd., Hatboro, Pa.—A new catalogue (T-50), which contains 20 pages, describes completely the pneumatic, magnetic, electric, electronic, and electronic-follower transmission systems for use in measurement and control of flow, pressure, liquid level, viscosity and specific gravity. It is profusely illustrated, containing performance characteristics and schematic diagrams of the various systems.

Valves. Ledeen Mfg. Co., 1600 S. San Pedro St., Los Angeles 15, Calif.—16-page Bulletin 1000, describing and illustrating the complete line of Ledeen valves, includes illustrations, operating and circuit diagrams, and dimensions and weights.

Packing Gland. Conax Corp., 4515 Main St., Buffalo 21, N.Y.—1-page Bulletin PG-1 contains a description, illustration, and specifications of the various models of the Conax midget packing gland.

Pumps. Warren Steam Pump Co., Inc., Warren, Mass.—Instructions for installation and operation of centrifugal pumps are contained in 11-page Bulletin 302-30 (revised). Bulletin 202, containing 19 pages, gives instructions for installing and maintaining "Realwear" type reciprocating pumps, together with useful data. Information on installation, operation and maintenance of Warren-Quimby pumps is contained in 10-page Bulletin 100-2. Many charts, tables, and drawings are included in these three bulletins.

Industrial Meter. Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.—A new corrosion resistant stainless steel industrial meter is described in Bulletin OG-403. Special reference is made to the value of the meter in the handling of corrosive liquids common to the cellulose, chemical, confectionery, food, oils and fats, rubber, pharmaceutical and industrial processing fields. Information is included on registers, register weights, units of measurement, materials and meter weight. Complete meter and register dimensions are also shown.

Dust Filters. Day Co., 817 3rd Ave., N.E., Minneapolis 13, Minn.—This 16-page dust filter bulletin, No. 528, deals with all the aspects of dust control as achieved by the Hersey-type dust filter. Dimension charts, capacity ratings and diagrams and photographs of specially engineered and installed layouts are presented. A printed loose-leaf sheet called a dust problem analysis sheet, which is to be filled out and returned to Day Co. for consideration and recommendation, is included.

Centrifugal Pumps. Ingersoll-Rand Co., Dept. C.P., 11 Broadway, New York 4, N.Y.—Designated as Form 7223, a 16-page bulletin covering general purpose centrifugal pumps of the cradle-mounted type includes five basic cradle groups and 17 corresponding pump types, their capacities, horsepower ratings and uses. There are also two pages covering pump dimensions and a table of performance under 60 cycle use. In addition, two pages describing special purpose units and design modifications are included.

Tachometers. Metron Instrument Co., 432 Lincoln St., Denver 9, Colo.—Technical Data Sheet No. 48HJK describes type 48H, 48J, and 48K portable tachometers, giving their purpose, typical applications, outstanding features, description, a section on the selection of proper tachometer and adapters, ordering instructions, price and terms. A table of speed ranges with recommended tachometers and adapters is included.

Circuit Breakers. Heinemann Electric Co., 487 Plum St., Trenton 2, N.J.—A new 16-page manual (101), explaining operating principles of basic circuit breaker designs and providing engineering data on factors of application, includes simplified diagrams showing the three basic types of circuit breakers in general use today, with brief descriptions. Through colored charts and diagrams, explanations of temperature factors, inrush current effects, tripping and reset time, and time delay curves are provided. Also discussed are the questions of quick or slow make-and-break, and wire deterioration rates at various ampere values.

Metal Hose & Tubing. American Brass Co., American Metal Hose Branch, Waterbury 20, Conn.—"Quick Reference" Catalogue CC-400, consisting of 16 pages, describes American flexible metal hose and tubing (seamless and strip wound). The catalogue shows a wide range of available alloys and sizes and suggested applications and furnishes data on hose and fittings. Engineering information is also included.

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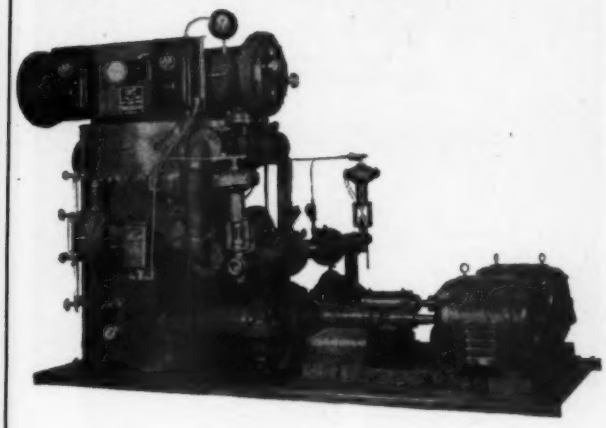
Another Michigan mill switches to the Stickle vacuum pump

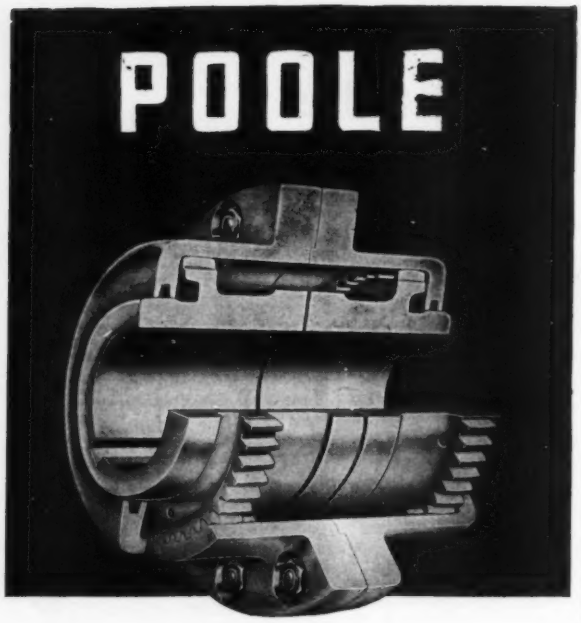


The Stickle 10-30 duplex vacuum pump shown above recently was installed in a Michigan mill to replace a vacuum pump which frequently caused costly interruptions in production. The Stickle vacuum pump, main unit of the Stickle vacuum differential drainage system, offers these four advantages:

1. Higher efficiency—The Stickle vacuum pump keeps dryers free of condensate and air, returns condensate to boiler room at higher temperature.
2. Fewer failures—The Stickle vacuum pump is designed for paper mill operation where exterior temperatures and humidity are extremely high. Duplex model has duplicate pumps, motors, controls to prevent costly interruptions in case of emergency.
3. Lower cost—The Stickle vacuum pump shortens heat-up period. Built-in heat exchanger eliminates costly cooling equipment and need for adding raw water to condensate return. Standard pumps and motors are easy and inexpensive to replace.
4. Greater flexibility—The Stickle vacuum pump permits 25% pump capacity increase at small cost. Drying pressure changes may be handled automatically.

The Stickle vacuum pump will handle vacuums up to 28" with 33° condensate. Available in single and duplex models—each in ten sizes. Capacities for Single model up to: 150 GPM (water) and 145 CFM (air), or 450 GPM (water only). With Duplex model, these capacities are doubled. Every Stickle installation is guaranteed. Write for free bulletin—No. 260.

Stickle Steam Specialties Company
2215 Valley Avenue • Indianapolis 18, Indiana



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PHOTOVOLT

Photoelectric REFLECTION METER

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MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

The following are quotations to mills, f.o.b. New York:

	¢
No. 1 White Shirt Cuttings	13.50 to 14.00
New Unbleached Muslins	14.50 to 15.00
Fancy Shirt Cuttings	6.75 to 7.00
No. 1 Percales	6.75 to 7.00
No. 1 Washables	4.00 to 4.25
No. 1 Light Silesias	8.00 to 8.50
No. 1 Light Prints	6.50 to 6.75
Light Flannelettes	8.00 to 8.50
Cottonades	4.25 to 4.50
Blue Overalls	7.00 to 7.50
Blue Cheviots	7.00 to 7.50
Canton Flannels, Bleached	11.00 to 11.50
Canton Flannels, Unbleached	11.00 to 11.50
Osnaburg Cuttings	8.00 to 8.50
Underwear Cuttings, Bleached	14.50 to 15.50
Underwear Cuttings, Unbleached	14.50 to 15.50
Khaki Cuttings—	
Sun Tan	8.50 to 9.00
Mixed	4.00 to 4.25
Linen Cuttings—	
American	8.50 to 9.00
White	14.00 to 15.00
Grey	14.00 to 15.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Roofing—	
No. 1	1.25 to 1.35
No. 2	.95 to 1.05
No. 3 and 4	.80 to .90
Twos and Blues—	
Repacked	2.50 to 2.75
Thirds and Blues—	
Repacked	2.25 to 2.50
Miscellaneous	1.75 to 2.00
Whites, No. 1—	
Repacked	5.50 to 5.75
Miscellaneous	4.75 to 5.00
White, No. 2—	
Repacked	4.50 to 4.75
Miscellaneous	3.75 to 4.00

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	4.75 to 5.00
Domestic	4.75 to 5.00
Wool Tares—	
Light	5.75 to 6.00
Heavy	6.00 to 6.25
No. 1 Scrap Bagging	4.25 to 4.50
Manila Rope—	
No. 1 large	7.00 to 7.50
No. 1 small	6.00 to 6.50
Sisal Rope—	
No. 1 large	6.00 to 6.25
No. 1 small	5.50 to 5.75
New Burlap Cuttings	6.50 to 7.00
Jute Threads—	
Foreign (Nom.)	6.75 to 7.25
Domestic	6.75 to 7.25
Strings—	
No. 1 sisal	5.50 to 5.75
No. 2 sisal	5.00 to 5.25
Soft jute	5.25 to 5.50
Mixed	3.00 to 3.25

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

	per ton
Shavings—	
Hard White Env. Cuts	115.00 to 125.00
Hard White No. 1	85.00 to 90.00
Soft White, one-cut	70.00 to 75.00
Soft White, No. 1	55.00 to 60.00
Coated Soft	40.00 to 45.00
Fly Leaf No. 1	25.00 to 30.00
Fly Leaf, Woody No. 1	25.00 to 30.00
No. 2 Mixed Col. Woody	20.00 to 25.00
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	20.00 to 22.00
Mixed Books	14.00 to 15.00
Ledger Stock—	
No. 1 White	55.00 to 60.00
No. 1 Mixed (Colored)	35.00 to 40.00
Manilas—	
New Env. Cuttings	65.00 to 70.00
New Env. Cuts, One-Cut	
Extra Manilas	22.50 to 25.00
Manila Tab Cards, Free of Ground Wood	65.00 to 70.00
Colored Tab Cards	45.00 to 50.00
Kraft—	
New Envelope Cuttings	65.00 to 70.00
Tripled Sorted No. 1 100%	40.00 to 45.00
No. 1 Old Assorted	30.00 to 35.00
News—	
White Blank	55.00 to 60.00
Overissue	22.00—
No. 1 Folded	16.00—
Old Corrugated Containers	22.00—
New Jute Corrugated Cuts	26.00—
Mill Wrappers	14.00—
Box Board Chips	11.00—
No. 1 Mixed Paper	10.00—

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.55—
Ground, cwt.	4.30—
Powdered, cwt.	4.70—
Blanc Fixe—	
Pulp, bulk, ton	90.00—
Dry, barrels	95.00—
Bleaching Powder—	
Drums, cwt.	5.00 to 6.00
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	28.00—
Argentine, lb.	17.50 to 18.00
China Clay—	
Domestic Filler Bulk (mine) ton	10.00 to 15.00
Domestic Coating Bulk (mine) ton	17.00 to 25.00
Imported (ship side) Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tanks cars (wks) cwt.	2.90—
Gelatine (silicin), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	44.00 to 44.50
Litharge, powd. bbl. lb.	.13½ to .14

MARKET QUOTATIONS

Rosin (Gum)—	New York, per 100 lbs.
E	8.30—
F	8.30—
G	8.30—
WW	8.65—
Rosin (Wood), carlots, F.O.B. South	4.50 to 4.75
Salt Cake—	
Dom. bulk (wks) ton	17.00 to 23.00
Imp. bulks on dock—(Atl. ports) ton (Nom.)	22.00—
Soda Ash—	
Bulk (works) cwt.	1.35—
Paper bags, cwt.	1.65—
Soda (Caustic)—	
Solid drums, cwt.	3.35 to 3.40
Ground and flake, drums, cwt.	3.75 to 3.85
Sodium Silicate—	
60 deg. 55 gal. drums, (works) cwt.	1.60 to 1.70
40 deg. 55 gal. drums, (works), cwt.	1.30 to 1.40
Starch—	
Pearl, 140 lb. bags, cwt.	6.39—
Pearl, barrels, cwt.	6.39—
Paper (Sp.) bags, cwt.	6.39—
Powdered, barrels, cwt.	6.60—
Sulphur (Crude)	
(Mine) bulk, long ton	25.50 to 27.50
Talc—	
Dom. 100 lb. bags (mine) ton	25.00 to 28.00
Canadian	35.00 to 45.00
Titanium Dioxide—	
Barium Pig. bbls., lb.	.21 to .21½
Calcium Pig. bbls., lb.	.21 to .21½
Zinc Sulphide, bbls., lb.	11.50 to 11.75

WOOD PULP

Quotations on domestic and Canadian wood pulp, dollars per short air dry ton, delivered consuming mills including basic freight allowances, follow:

Bleached Sulphite	140.00—
Bleached Sulphite, Canadian	140.00—
Unbleached Sulphite	120.00—
Unbleached Sulphite, Canadian	120.00—
Bleached Soda	140.00—
Bleached Soda, Canadian	140.00—
Kraft, Bleached	145.00—
Kraft, Bleach., Southern	142.50 to 150.00
Kraft, Bleach., Canadian	145.00 to 150.00
Kraft, Unbleached, Northern	132.50—
Kraft, Unbleached, Southern	100.00—
Kraft, Unbleached, Canadian	100.00 to 125.00
Kraft, Semi-Bleached, Southern	140.00—
Sulphite Screenings	72.50—
Sulphate Screenings	67.50—
Groundwood	82.50 to 87.50

Quotations on imported wood pulp, dollars per short ton, on dock American Atlantic ports with varying freight allowances, follow:

Bleached Sulphite, Swedish	130.00 to 140.00
Bleached Sulphite, Norwegian, freight allowed	140.00—
Bleached Sulphite, Finnish, freight allowed	140.00—
Unbleached Sulphite, Swedish	110.00 to 115.00
Unbleached Sulphite, Finnish, freight allowed	120.00 to 125.00
Kraft, Unbleached, Swedish	100.00 to 105.00
Kraft, Unbleached, Finnish, freight allowed	105.00 to 135.00
Kraft, Bleached, Swedish, on dock	137.50 to 142.50
Kraft, Bleached, Norwegian	

PAPER

Boards—

Prices per ton, delivered, 10 tons or more:

Plain Chip	70.00—
News vat lined chip	82.50—
Filled news	82.50—
Solid news	85.00—
White vat lined chip	115.00—
Chip tube and can stock	90.00—
Single manila lined chip	120.00—
Single jute lined chip	115.00—

White patent coated:

.020	155.00—
.018	157.50—
.016	160.00—

Book Paper—

Coated two sides

70 lb. No. 2 enamel, 25x38-500, trimmed 4 sides	4 cases $17.25 Carloads $16.30
45 lb. enamel, 25x38-500, trimmed 4 sides	4 cases $13.05 Carloads $12.10

Uncoated

55 lb. No. 2 offset, 25x38-500, trimmed 4 sides	4 cases $14.80 Carloads $13.85
50 lb. A Grade English Finish, 25x38-500, untrimmed	4 cases $14.05 Carloads $13.10
20 lb. envelope, 17x22-500, untrimmed	Carloads $12.40
16 lb. tablet, 17x22-500	Carloads $11.35

Rag Content Bond—

Extra 100% rag	70.45—
100% rag	62.65—
75% rag	48.15—
50% rag	38.90—
25% rag	31.75—

Rag Content Ledger—

Extra 100% rag	72.65—
100% rag	63.90—
85% rag	52.50—
75% rag	49.40—
50% rag	40.20—
25% rag	33.00—

Sulphite Bond—

Air dry bond (Watermarked)	19.00—
No. 1 bond (M.F. watermarked)	15.00—
No. 2 bond (M.F. watermarked)	14.00—
Plain bond (M.F. unwatermarked)	14.00—

Sulphite Ledger—

No. 1, M.F. watermarked	20.50
No. 2, M.F. watermarked	19.50
Plain, M.F. unwatermarked	19.00

News—	per ton
Rolls, Standard (Contract)	123.00 to 126.00
Rolls (Spot)	(Nominal)
Sheets	138.00—

Tissues (Carlots)—	per ream
White No. 1	1.80—
White No. 2	1.35—
Bleached Anti-Tarnish	2.20—
Colored	2.00—
Anti-Tarnish Kraft	1.70—
Manila	2.00—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.90—
Napkins, full crepe and embossed (12½ lb. to M shts.) per cs.	.90—
Toilet, Bleached (M shts.) per cs.	9.35—
Toilet, Unbleached (M shts.) per cs.	7.90—

Towels	per case
Bleached	6.80—
Unbleached	5.90—

Wrappings (Kraft)—	per cwt.
Standard wrapping	7.75—
Butchers, counter rolls	8.25—
Standard bag, mill rolls	7.50—
Shipping sack, mill rolls	7.75—
Gumming, mill rolls	9.00—
Asphalting, mill rolls	7.75—
Envelope, mill rolls	9.25—

...with Atkins Silver Steel® Knives

Get uniform, clean-cut, waste-free chips—better quality, more profitable pulp—with Atkins *Silver Steel* chipper knives.

Atkins knives are extra sharp—and you'll find they stay that way through an entire scheduled run. They're extra tough, too—you'll see them slice through hardest wood with speed and ease. They're made of finest steel—carefully balanced in sets, heat-treated to exact specification, accurately ground to size. Most Atkins chipper knives are also ground with a *secondary bevel*, which adds to the strength of the cutting edge, helps clear the chips as they fall from the cut.

Call your Atkins distributor now. Ask him for Atkins *Silver Steel* chipper knives—available in perfectly balanced sets for any machine, for any type fastening you require. Standardize with Atkins—your dependable source for chipper knives.

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(Successor to E. C. Atkins and Company)

pulp and SARAN RUBBER* go hand in hand!

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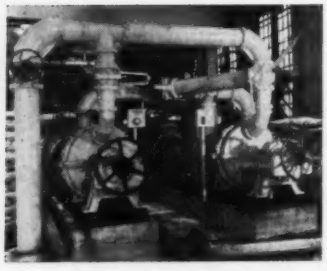
Saran Rubber-Lined Steel Pipe

*a development of The Dow Chemical Company



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We invite you to submit your particular pipe corrosion problem to our Application Engineering Department.

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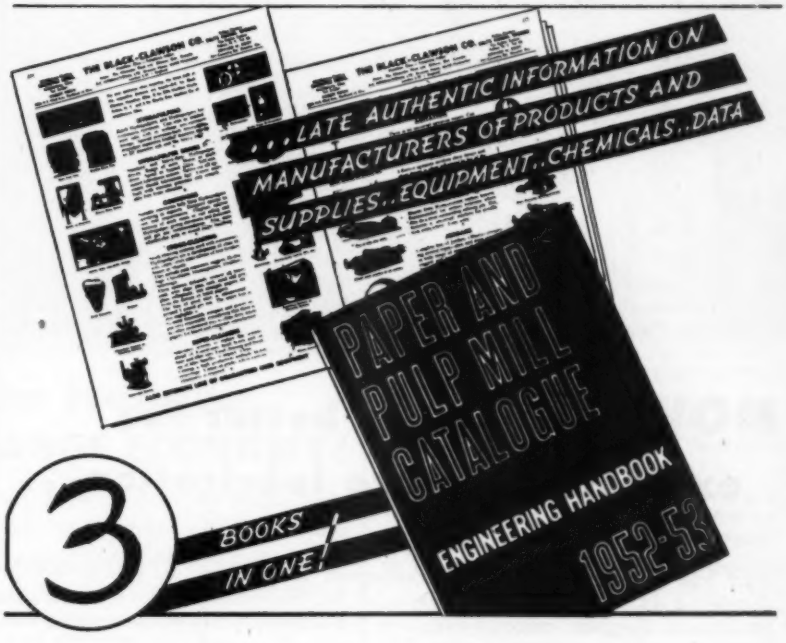
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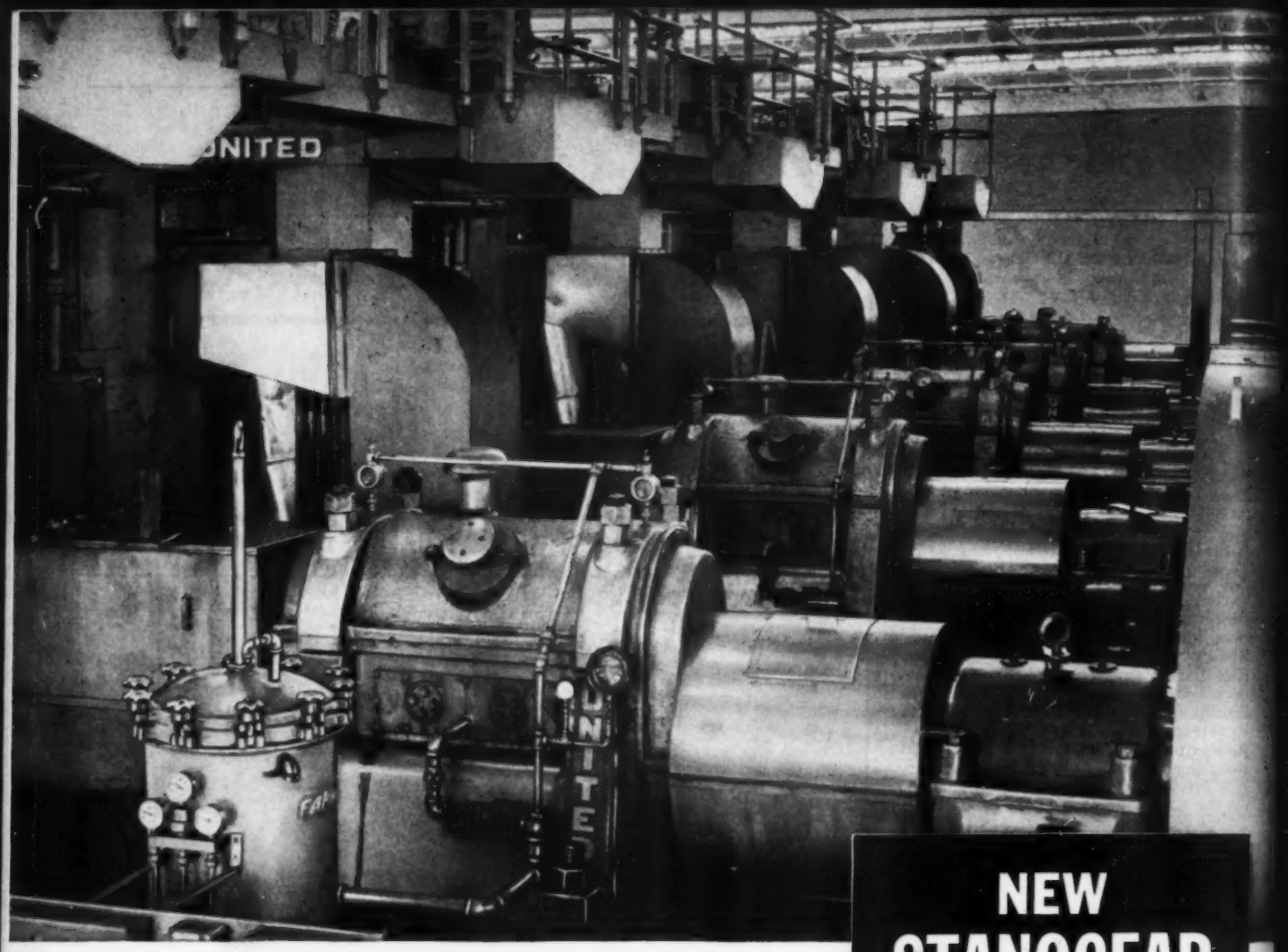

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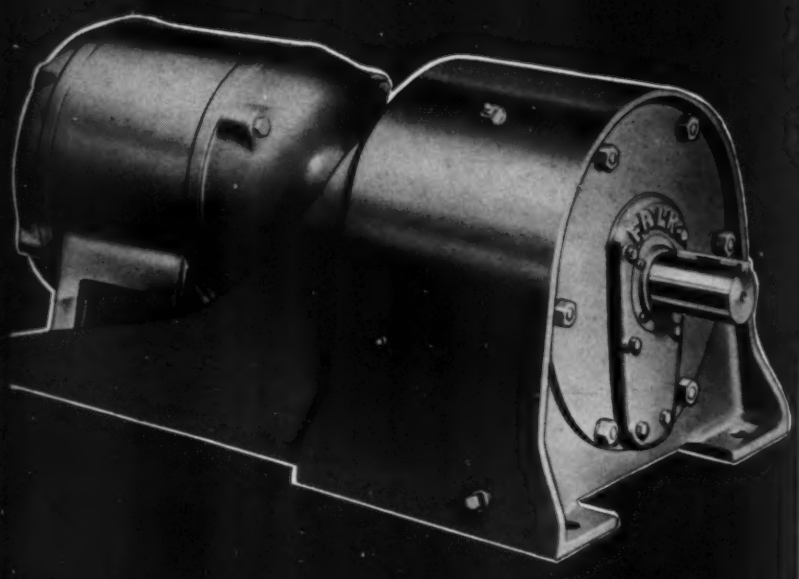

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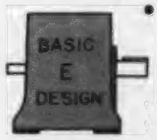

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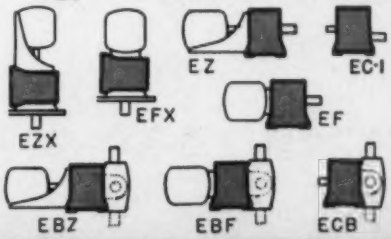

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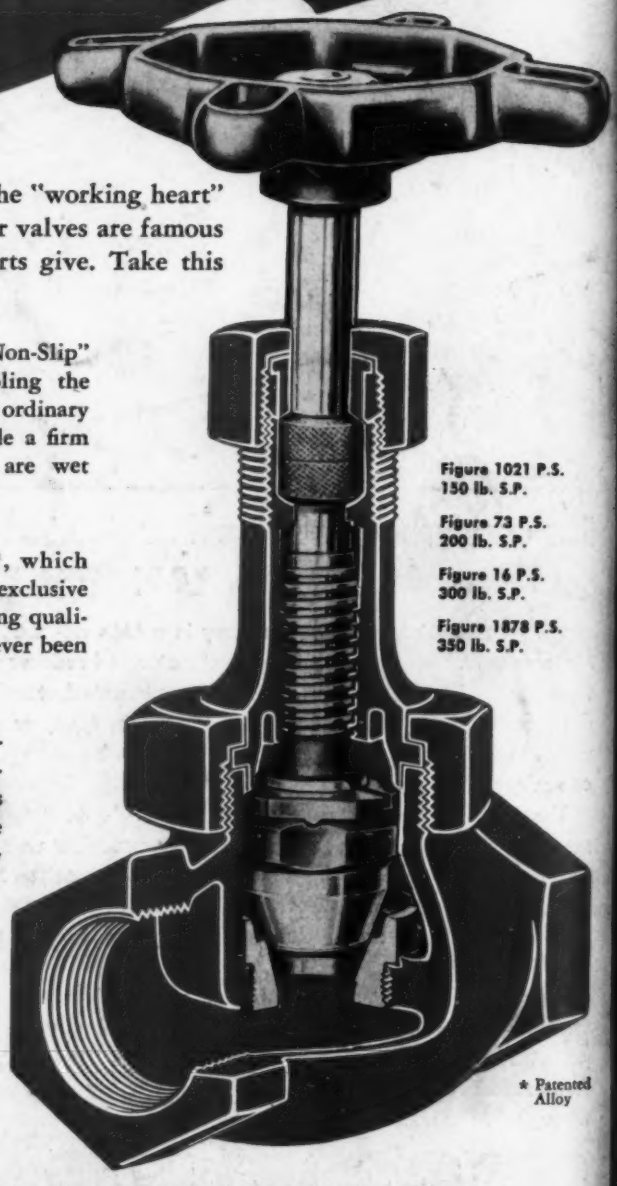

Figure 1021 P.S.
150 lb. S.P.

Figure 73 P.S.
200 lb. S.P.

Figure 16 P.S.
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